MARCH, 1956

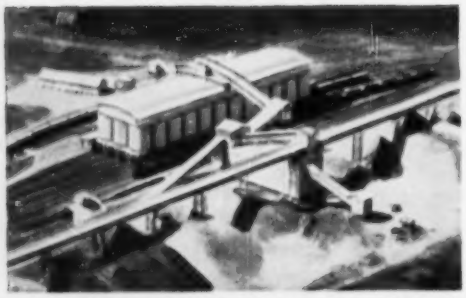
Commercial Fertilizer

and PLANT FOOD INDUSTRY

Three of the A.A.C. Co's electrically-operated draglines at work at our phosphate mines in Central Florida. Bucket capacities range from 9½ to 17 cubic yards. The 17-yard draglines with their 175-foot booms each weigh more than a million and a half pounds and can move 35,000 tons of material in 24 hours. From these rock deposits flow a continuous stream of high quality phosphate rock, assuring a dependable source of supply of AA QUALITY phosphorus products, see list below.

AA Quality...

for over 85 years a symbol of quality and reliability



From the air—wet rock storage and drying plant, with dry rock storage silos in background. These silos, 29 in number, have a total capacity of 40,000 tons of dried rock. Under the silos are four runways where 40 railroad cars can be loaded at a time.

principal AA QUALITY products

All grades of Florida Pebble Phosphate Rock
AA QUALITY Ground Phosphate Rock
All grades of Complete Fertilizers **Superphosphate**
Gelatin **Bone Products** **Salt Cake** **Ammonium Carbonate**
Sulphuric Acid **Fluosilicates** **Insecticides and Fungicides**
Phosphoric Acid and Phosphates
Phosphorus and Compounds of Phosphorus

THE AMERICAN AGRICULTURAL CHEMICAL COMPANY

GENERAL OFFICE: 50 CHURCH STREET, NEW YORK 7, N. Y.

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and PLANT FOOD INDUSTRY

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Commenting Freely

by BRUCE MORAN

Dr. Paul E. Nystrom, Head, Extension Service, University of Maryland expressed our sentiments —which we have frequently expressed in these pages over the years since 1910. Talking to the Del-Mar-Va group he said: "A fertilizer salesman should inform as well as sell. A county agent just does not have time to get around to see all the farmers in his county and tell them what is new in fertilizer recommendations and practices.

"The fertilizer representative has a definite duty, I believe, to relay the new practices and information to farmers that the county agent can't reach. The county agent is said by some to know a little about a lot of things, but, after all, isn't a fertilizer representative a specialist in his own field?"

To which a chorus will answer that the fertilizer salesman is a specialist when he is trained that way. Otherwise he is likely to be heavy on the side of discount peddling. Not his fault, but his management's fault, if that's the kind of man he is. And by "relay" the good Doctor didn't mean calling on all the back roads—but seeing to it the fertilizer dealer knows the facts, and how to tell them to the farmer.

IN LESS THAN 10 MONTHS . . .

Standard of the Industry

GRANULATION OF MIXED FERTILIZERS

"KEYSTONE OF THE INDUSTRY"

WEATHERLY PROCESS

DESIGNED BY

THE D. M. WEATHERLY CO.
ATLANTA, GA.

Unknown a year ago last June, from a standing start the Weatherly Controlled Granulation Process has grown in acceptance until today it is turning out more quality tonnage, plant for plant, than any other method . . . the standard by which the industry now judges granulation. BECAUSE:

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Let us tell you about it . . . show you Weatherly units in action . . . let you talk to operators with a season's experience.

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Slippery bags may be merely a source of mild irritation . . . but they can also be the cause of serious injury to both man and business.

Literally, Hudson *inks out* this hazard. Non-Slip inks, now standard on Hudson Multiwalls, put the brakes on slippage. When stacked, they cling to each other like honeymooners in the dark. Shipped in bumping trucks or humping boxcars, Hudson sees your product through *securely*.

If you'd like to know more of the Hudson story as it relates to your business . . . such as *certified supply* through complete integration from Hudson-owned forests to Hudson-made kraft . . . or *sure-time delivery* through controlled scheduling from four strategically located plants . . . use the coupon and we'll be glad to visit at your convenience.

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Plants at
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Yes! We'd like a copy of the 46-page illustrated book on "What to Look for in a Dependable Source of Supply," and details on the Hudson guarantee.

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COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

JUST AROUND THE CORNER *by Vernon Mount*

ONE HEARTBEAT is very much on the public mind these days, and will be a major factor in the thinking of politicians of both parties. The net result of this may well produce a more serious consideration of the vice-presidency.

"SUPPOSE HE SUCCEEDS to the Presidency" will be more than a casual thing this year. Instead of the vice-presidential men being chosen in haste, when the delegates are worn out, the various possibilities will be seriously discussed, and at length.

THE VICE PRESIDENCY, as a result, will be more than ever an important office--instead of the blind alley, backwater sort of post it once was. Not many can remember who was the Number Two man of a few administrations back. But they'll remember this one. And the Veep may well become what he should have been all along...an assistant President, constantly in training for the job that is just one heartbeat away.

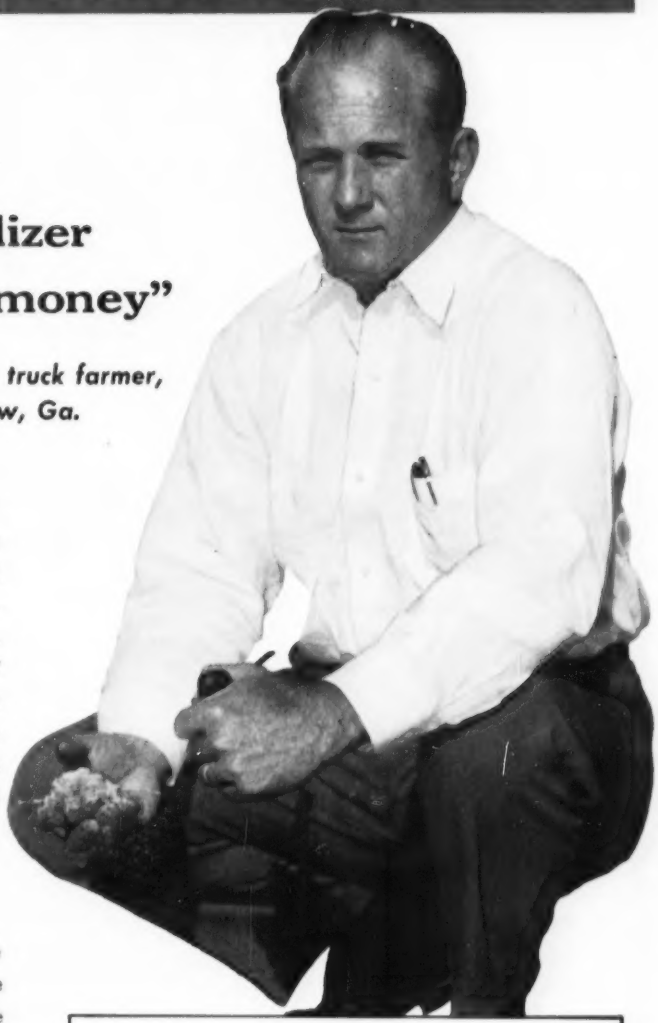
Yours faithfully,

Vernon Mount

HOW UNION BAG BUILDS MORE BUSINESS FOR THE FERTILIZER INDUSTRY

"Now I know... cutting down on fertilizer actually costs me money"

John Patrick, truck farmer, Marlow, Ga.



"I've known about fertilizer for a long time," says John Patrick, who with his brother Carl runs a 100-acre truck farm near Marlow, Ga., "but I didn't realize that every *dollar* invested in fertilizer can bring a farmer a *four dollar* return in crop value! That's how the U. S. Department of Agriculture figures it. Like a lot of farmers, I'd tried to *save* money by cutting down on fertilizer, but actually I was *losing* money, as I got lower yields on my crops. Now I know fertilizer is my best investment."

Union's information program increases fertilizer use

Mr. Patrick discovered his "profit formula" in one of the farm magazines he reads. The article was one of many prepared by Union as part of a countrywide newspaper-radio-television educational campaign to help farmers use more scientific methods.

One of the main purposes of this program is to show your customers how to make the best use of fertilizer. As one of the major manufacturers of Multiwall paper sacks for fertilizer, Union Bag is happy to make this contribution to the industry.

Mutual Fertilizer Company is one of the many leading manufacturers who package their products in Union Multiwall bags.

Mr. Charles Ellis Jr., President, Mutual Fertilizer Company, Savannah, Ga.

"I believe Union Bag's information program on the scientific use of fertilizer will help the farmers. Union does as well with its Multiwalls as it does with its fertilizer program. We use Union Multiwalls. They're among the best."

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"BUYING ARKSAFE MULTIWALLS WAS A GOOD MOVE

Production  **Manager**

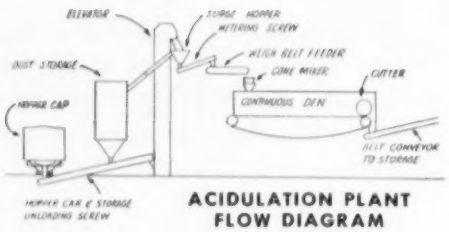
...the bag filling operation is running much better. The men like the way they handle and report far less breakage. The saving in time more than justifies our going over to them."

Purchasing  **Agent**

...After our Production Manager left, I decided to make another good move—and made a note on my calendar pad.

FARM SERVICE, INC. PLANT • OPELOUSAS, LA.

CONTINUOUS ACIDULATION PLANT



ACIDULATION PLANT FLOW DIAGRAM

Low Initial Cost • Low Operating Costs

Now even small and medium sized fertilizer operators can afford a D-K superphosphate plant with a continuous den and TVA cone mixer. Operating costs are unusually low. Two men can operate the plant at the *continuous* rate of 20 tons per hour. An actual sample taken recently from a new plant at Opelousas, La. shows this remarkably high analysis *before curing*:

MOISTURE	9.36%
T. P. A.	20.88%
INSOLUBLES	1.37%
A. P. A.	19.51%
FREE ACID	3.18%

For Complete Information Call:

DAVIDSON-KENNEDY CO.

1090 Jefferson Street, N.W. **Atlanta, Georgia, U. S. A.**

Your best assurance for a *continuous* supply is a completely integrated supplier!

Kraft Bag Corporation comes closest to being the most completely integrated manufacturer of multiwall shipping sacks in the industry!

Check this chart and see for yourself why Kraft Bag Corporation should be your supplier!

Tell us when we may call to discuss your requirements.

FEATURES	KRAFT BAG CORPORATION	OTHER SOURCES ?
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Pulp Mill	✓	
Bleach Plant	✓	
Paper Mill	✓	
Multiple Bag Plants	✓	
Natural Kraft	✓	
Colored Kraft	✓	
Bleached Kraft	✓	
Creped Kraft	✓	
Wax Laminated Kraft	✓	
Asphalt Laminated Kraft	✓	
Wet-Strength Kraft	✓	
Water Repellent Kraft	✓	
Stak-LOK Super Rough Kraft	✓	
Valve Bags—sewn or pasted	✓	
Open Mouth Bags—sewn or pasted	✓	
Flat Sewn Valve Bags	✓	
Flat Sewn Open Mouth Bags	✓	
KRAFT-lok Valve Closure	✓	
Creped Tape	✓	
Gummed Tape	✓	
Filter Cord	✓	
Sewing Thread—(the only material we do not produce ourselves)		
1-2-3-4 Color Printing	✓	
Art Department	✓	
Bag Development and Research	✓	

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Exclusive Sales Agents for Kraftpacker Automatic Open Mouth Bag Filling Machine

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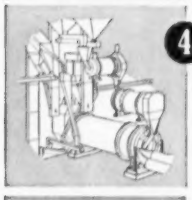
USE THIS 6-POINT "TURN-KEY" SERVICE

LINK-BELT offers unified responsibility for design, equipment and erection of complete, modern fertilizer plants

1 **MODERN LABORATORIES** have both miniature and full-scale facilities—offer free testing service on a few pounds or full carloads of your material. Link-Belt will also lease equipment for work in your plant.

2 **PILOT PLANT** and testing station, operated in cooperation with a leading university, continually works to find new ways to improve commercial fertilizer ... adapt laboratory procedures to plant conditions.

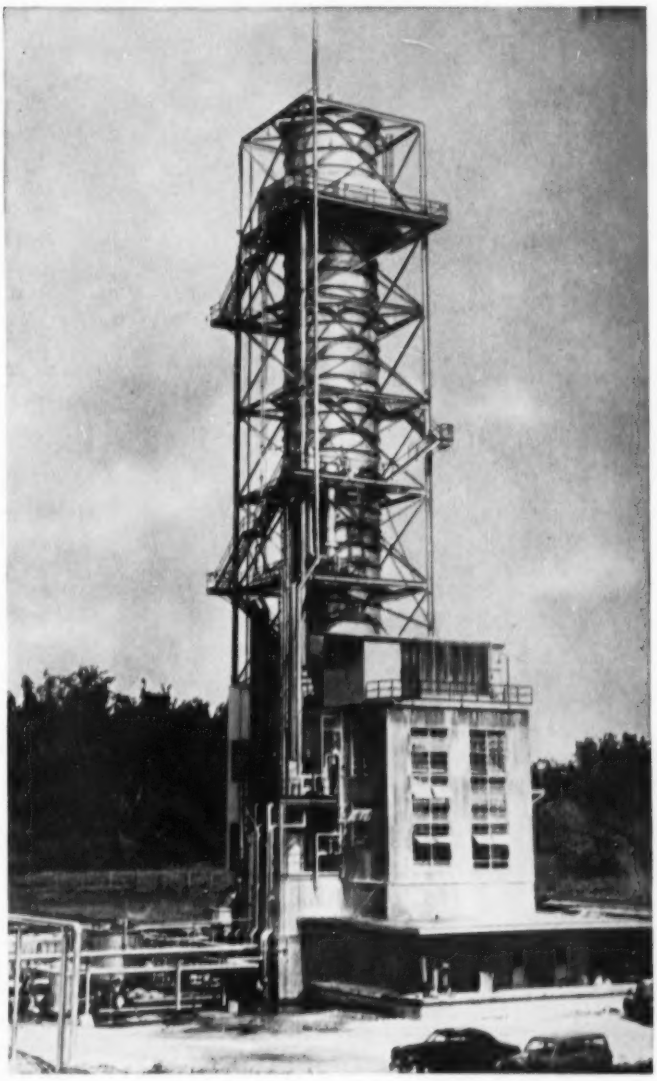
3 **ENGINEERING** based on broad, practical experience, assures better equipment that often permits use of lower cost ingredients. Other developments have reduced processing time, saved storage space.



4 **LINK-BELT EQUIPMENT** includes dryers, coolers, granulating drums, disintegrators, continuous mixers, ammoniators, roll crushers, all types of conveyors & elevators, vibrating screens, all types of chains & power transmission machinery.

5 **SKILLED ERECTION CREWS** When you rely on Link-Belt as a single source, Link-Belt accepts responsibility for placing your plant in full operating readiness. We will also supervise modernizing existing plants.

6 **SATISFACTORY MECHANICAL PERFORMANCE** can be assured. Link-Belt experience includes dry-mix, superphosphate, nitrophosphate, ammonium nitrate, ammonium sulphate, urea, granulation and other plants.



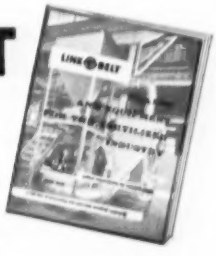
In this southern ammonium nitrate plant, Link-Belt supplied conveying, drying, cooling, mixing, elevating and screening equipment for a fully integrated system.

Get all the facts on how Link-Belt's unified responsibility for complete plants helps you produce better fertilizer at lower cost. Write for new 16-page Book 2459, or ask your nearby Link-Belt district sales office for your copy.

LINK-BELT

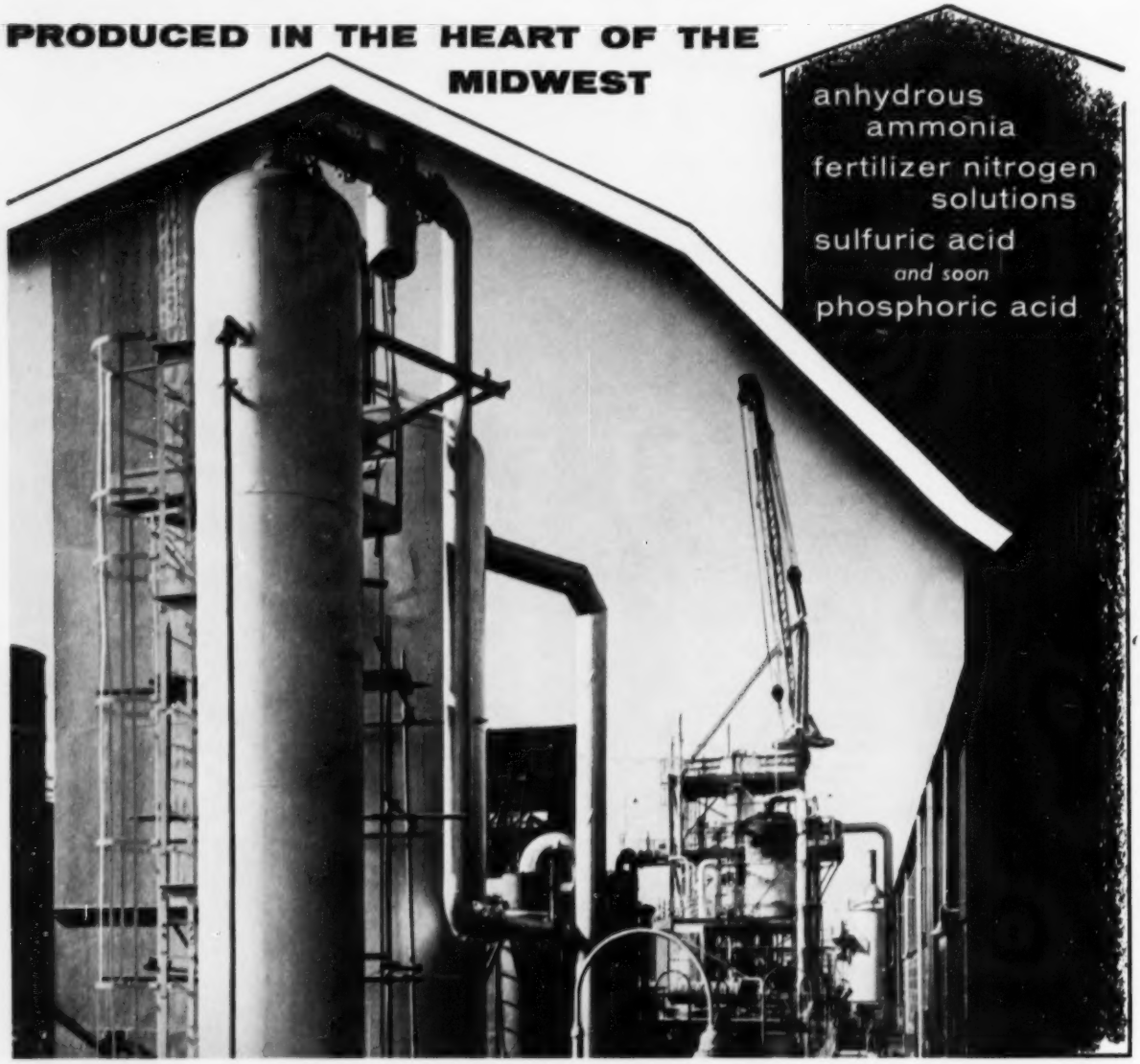
CONVEYING AND PROCESSING EQUIPMENT

14,014



LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

PRODUCED IN THE HEART OF THE MIDWEST



AT TUSCOLA, ILLINOIS – in the heart of the midwest farm area – U.S.I. produces a combination of agricultural chemical raw materials for fertilizer manufacturers.

Anhydrous Ammonia and Fertilizer Nitrogen Solutions From other U.S.I. affiliated plants at Tuscola, and from a natural gas reforming unit, hydrogen flows into the U.S.I. ammonia plant, where it is reacted with nitrogen to produce anhydrous ammonia and nitrogen solutions. Since the raw materials for this operation are produced internally, supply is steady, reliable and ample.

Sulfuric Acid U.S.I.'s 400 ton per day sulfuric acid plant produces all grades of virgin acids, including electrolytic and oleum, plus a good quality of process-spent acid suited to fertilizer manufacture. This plant operates year round, permitting U.S.I. to store during off-seasons for the large in-season agricultural demand. Other sulfuric acid plants are located at Dubuque, Iowa, and Sunflower, Kansas.

And Coming Soon – Phosphoric Acid U.S.I. is building a new plant at Tuscola to produce wet process phosphoric acid from phosphate rock and U.S.I.'s sulfuric acid. The plant is scheduled to go on-stream by the end of 1956. Design capacity will be 30,000 tons of P_2O_5 shipped as 75% phosphoric acid.

In the midst of the midwest farm area – where fertilizer demand is high and moving steadily higher – U.S.I. provides a single source for a variety of fertilizer raw materials. This source is a flexible one, since it is part of the company's chemical producing center at Tuscola. Other materials can be made for long-range demands.

For further information, address your nearest U.S.I. office, or contact Chemical Sales, U.S. Industrial Chemicals Co., 99 Park Avenue, New York 16, N. Y.

U.S.I. INDUSTRIAL CHEMICALS CO.
Division of National Distillers Products Corporation
99 Park Avenue, New York 16, N. Y.
Branches in principal cities

PHOTO COURTESY WESTERN GROWERS ASSN.

TRONA® POTASH *for Agriculture*

In 1917 state fairs were awarding prizes for outstanding farm products just as they are today. Then as now, growers depended on Trona® MURIATE OF POTASH for high quality crops. For it was in 1917 that Trona, first to produce domestic Potash when World War I pinched-off foreign sources, shipped the first train-load to the east coast. For the next twenty years Trona was the *only* domestic source of Potash and today, in spite of AMERICAN POTASH AND CHEMICAL CORPORATION'S broad diversification program, is still one of the primary basic suppliers of high grade Muriate and Sulphate of Potash for Agriculture.

PRODUCERS OF—

BORAX	**BROMINE**
POTASH	**CHLORATES**
SODA ASH	**PERCHLORATES**
SALT CAKE	**MANGANESE DIOXIDE**
LITHIUM	

—and a diversified line of specialized agricultural and refrigerant chemicals

MURIATE of POTASH, agricultural grades 95-98% KCL, (60% K_2O minimum), regular and granular.

SULPHATE of POTASH, agricultural grade, 95-98% K_2SO_4 (51% K_2O minimum).

TRONA

American Potash & Chemical Corporation

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San Antonio, Texas (American Lithium Chemicals, Inc.)

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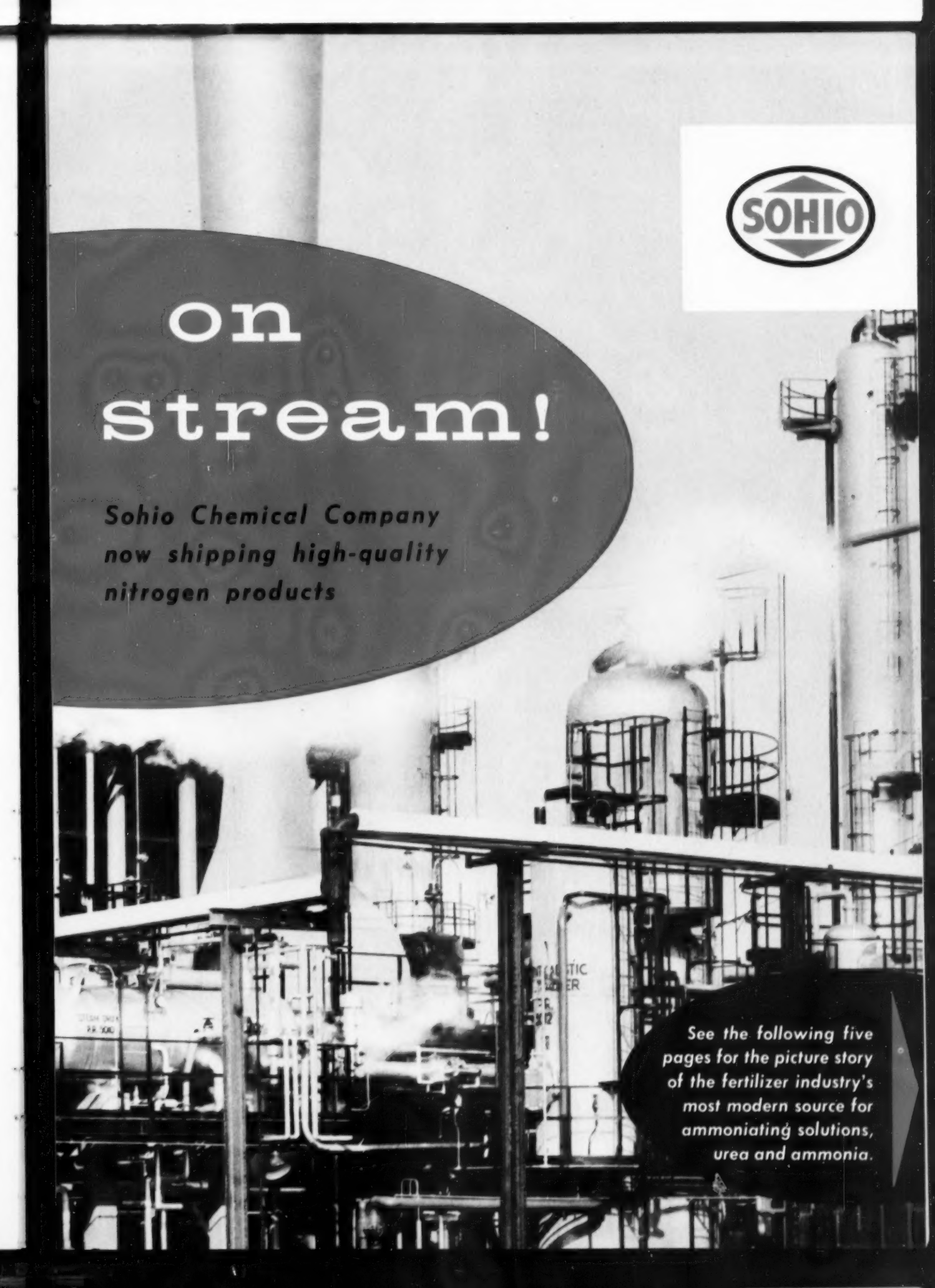
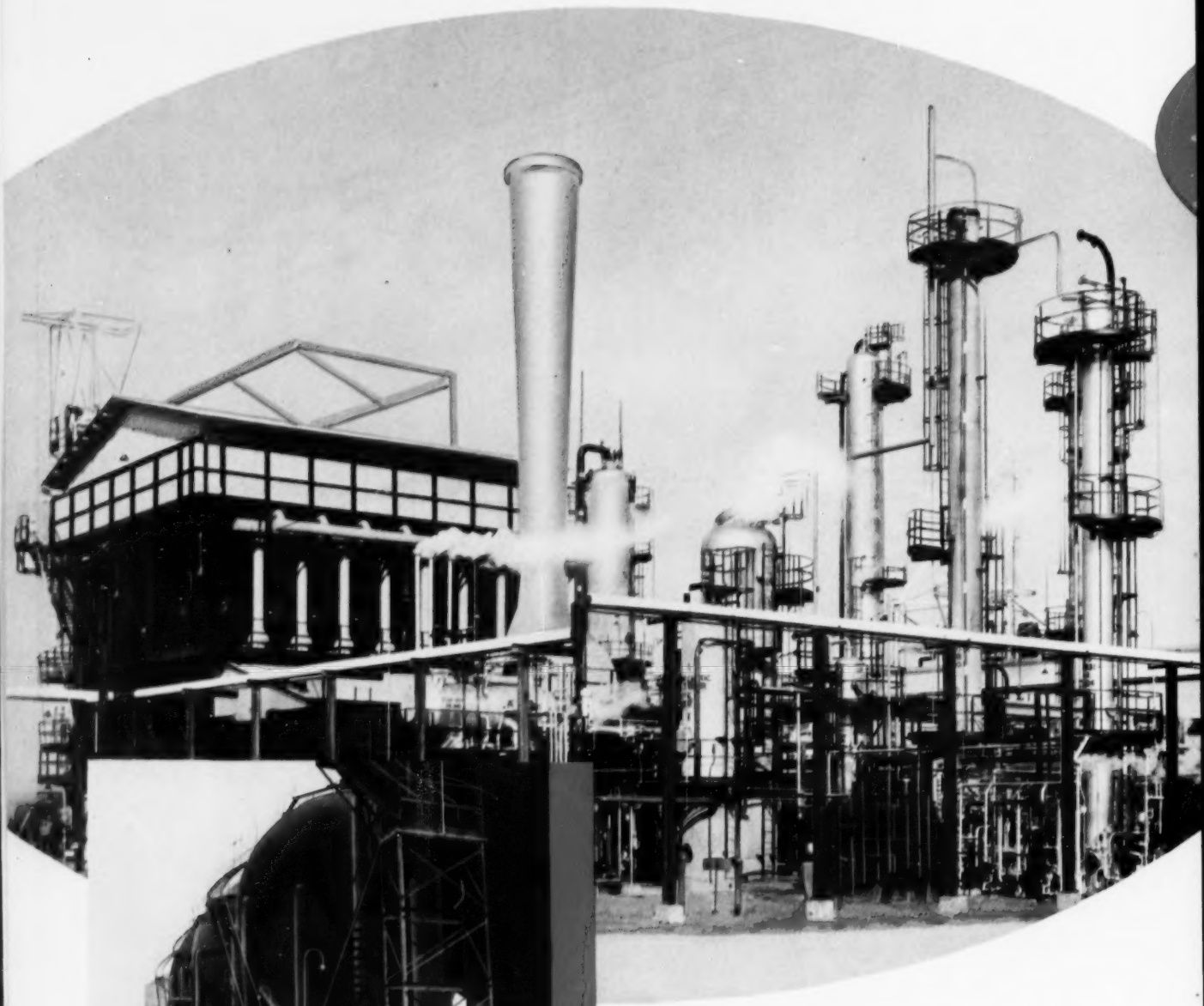

SOHIO
on stream!
Sohio Chemical Company now shipping high-quality nitrogen products
See the following five pages for the picture story of the fertilizer industry's most modern source for ammoniating solutions, urea and ammonia.

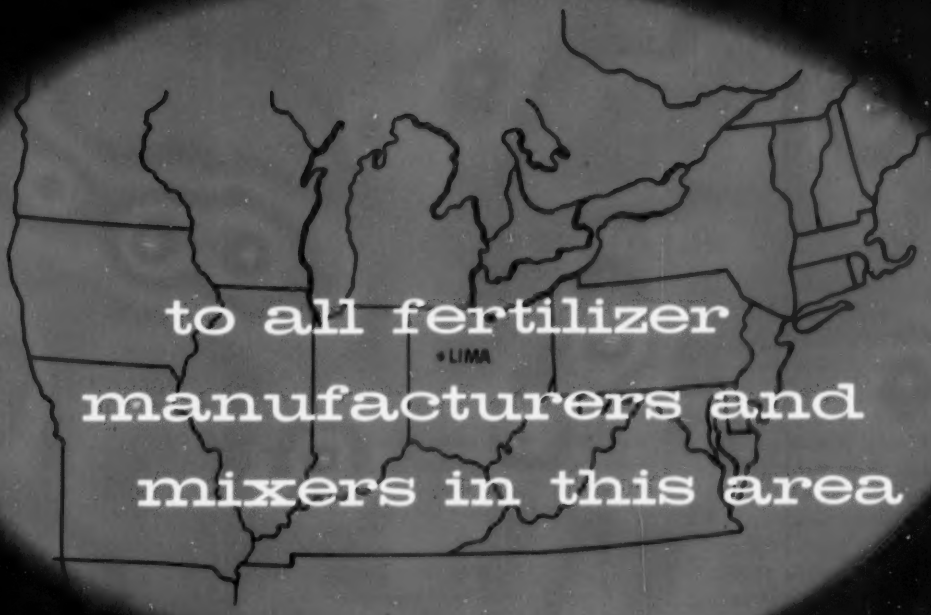


Ample anhydrous ammonia storage more than assures deliveries during peak demand periods.

Largest storage facilities in country in relation to production capacity.

DRAWING on the best available experience in the chemical industry, Sohio surveyed every known method of ammonia and urea production. Selecting the most reliable of processes to produce the highest quality product, the ultimate in a modern petrochemical plant was designed. No effort, no expense was spared. Users of nitrogen chemicals were questioned as to their product and delivery needs. Research and production departments were staffed with outstanding men. The new Sohio Chemical plant at Lima is as perfect as men and materials can make it.

AN INVITATION



to utilize the complete facilities and superior service of Sohio's new plant at Lima, Ohio

To bring this new plant into full production at this early date we worked 'round the clock . . . accomplished in weeks what normally requires months.

WE WANT TO BE INCLUDED IN YOUR 1956 PLANS! Here's your opportunity to acquire an efficient, dependable source for the finest nitrogen products:

- **ANHYDROUS AMMONIA**
- **AQUA AMMONIA** • **NITROGEN SOLUTIONS**
- **AMMONIATING SOLUTIONS** • **UREA**

fast service

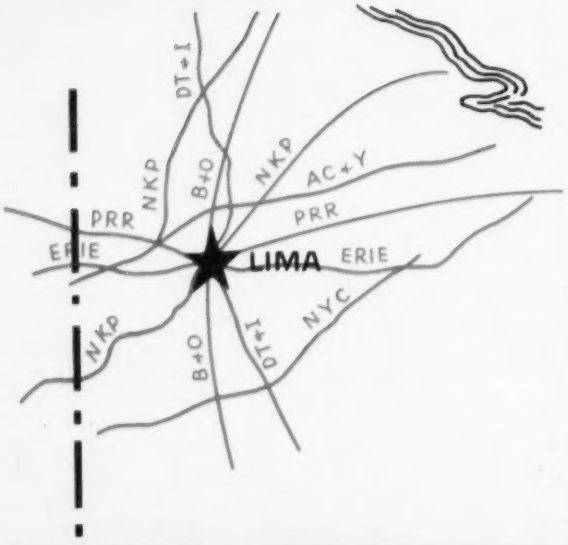
unmatched facilities

uniform high quality

Centrally located in America's agricultural heartland, Sohio's Lima plant is served by five railroads:

NICKEL PLATE **BALTIMORE & OHIO** **ERIE**
PENNSYLVANIA **DETROIT, TOLEDO & IRONTON**

These lines offer ready transfer to connecting roads. In addition, two of them provide switching service inside the plant area, assuring rapid rail service from Sohio's plant.



- Equipment and methods are the most modern among the thoroughly tested and proven processes.
- There is adequate provision for expansion.
- Uninterrupted operation is assured by multiple sources for natural gas, water, electrical power.
- Downtime is minimized because of Sohio's integrated maintenance system.

One of the most important requisites for a plant in this market is its ability to meet extraordinary delivery requirements. Sohio's shipping and storage facilities are geared to these needs. For example, rail car loading capacity is *four* times productive capacity. In addition, Sohio's own trucks are ready to ship on relatively short notice. And no other producer offers a more complete line of ammoniation products.

New aluminum 5200-gallon solutions and 6800-gallon steel anhydrous ammonia tank trucks furnish regular delivery service within normal trucking area and twenty-four hour emergency service throughout distribution area. Excellent road facilities to all points.

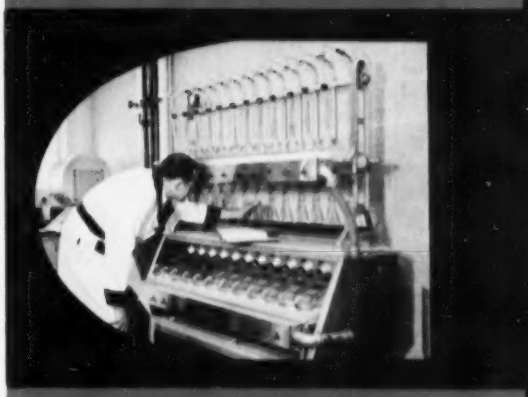
Electronic Quality Control

pays dividends to Sohio customers

New electronic methods — unique systems never before used in this industry — maintain quality and production control at Sohio Chemical Company. Every phase of ammonia production is electronically scanned five times each minute and recorded by the Data Logger, an instrument originally perfected for the Atomic Energy Commission. Production and quality conditions are recapped hourly by the Data Logger and transmitted to IBM cards for continuing analysis by an "electronic brain." This assures uninterrupted quality production. Pictured here are other quality checks that continuously safeguard quality.

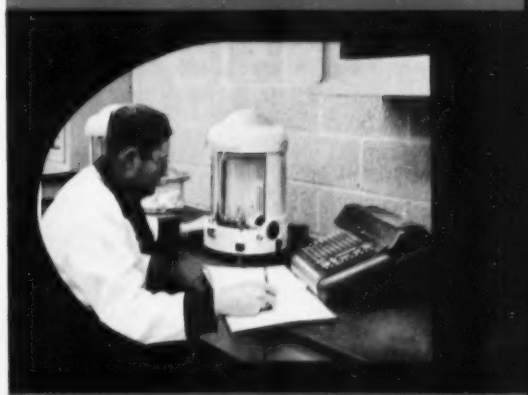
Sohio's all-new fleet of aluminum solutions tank cars and high pressure steel anhydrous ammonia tank cars are ready to serve you. These cars and the tank trucks are equipped with the most modern devices including spring-loaded relief valves to meet your requirements for safer, quicker, more economical service.

Infra-red Spectrophotometer analyzes the various process gas streams.



Kjeldahl rack used in determining nitrogen content of materials to make quantitative analysis.

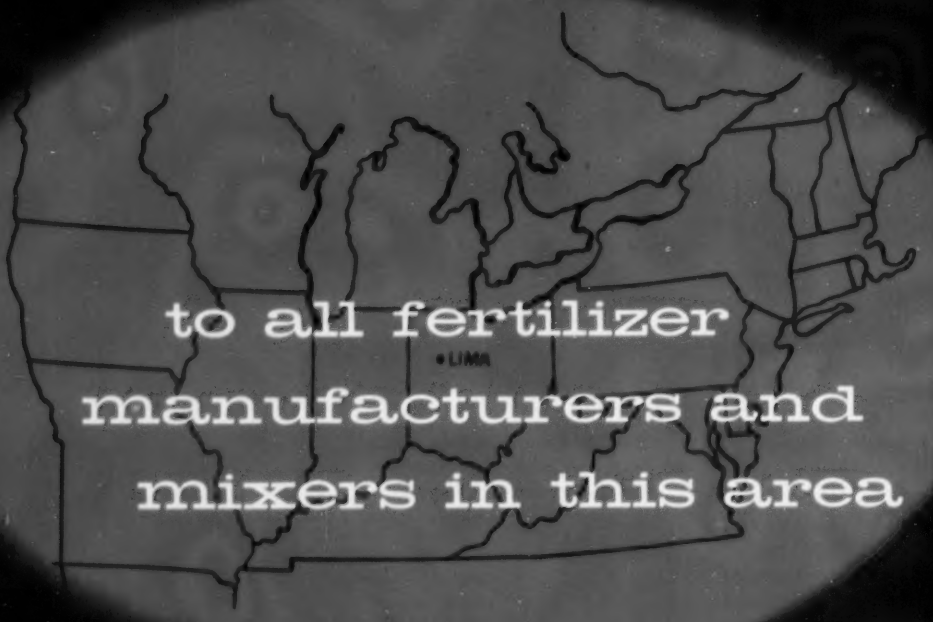
Standardizing titration solutions for finished product analysis with the Titrometer.



Sartorius Balance is a high-speed instrument capable of accurately weighing analytical samples.

Mass Spectrometer performs rapid and graphic electronic analysis of the process gases.

AN INVITATION



to all fertilizer manufacturers and mixers in this area

to utilize the complete facilities and superior service of Sohio's new plant at Lima, Ohio

To bring this new plant into full production at this early date we worked 'round the clock . . . accomplished in weeks what normally requires months.

WE WANT TO BE INCLUDED IN YOUR 1956 PLANS! Here's your opportunity to acquire an efficient, dependable source for the finest nitrogen products:

- **ANHYDROUS AMMONIA**
- **AQUA AMMONIA** • **NITROGEN SOLUTIONS**
- **AMMONIATING SOLUTIONS** • **UREA**

BIGGEST CROWD EVER AT

MIDWEST SOILS

More than 600 representatives of fertilizer and associated industries came together for their 8th annual meeting with college agronomists from 13 corn belt states at Edgewater Beach Hotel in Chicago February 16-17. Middle West Soil Improvement Committee, which sponsors the meeting, had again assembled an all-star cast for a program that was as varied as the area's interests allow.

Initial morning of the meeting was devoted to registration and a preview of visual aids, moderated by J. D. Cook of the Fertilizer Division of Illinois Farm Supply Co., Chicago.

An afternoon session featured talks on research in three of the states, insecticide-fertilizer mixtures, and farm management planning. Kermit C. Berger, professor of soils at University of Wisconsin and program chairman for the meeting, presided at this gathering. After a brief welcome from W. M. Newman (Price Chemical Co., Louisville), president of MWSIC, the program got quickly under way.

An Illinois agronomist reported that heavy fertilization had boosted corn yields 50 bushels per acre in 1955 on some experimental fields cropped continuously to corn for many years at the famous Morrow Plots at Urbana, oldest fertilizer experiment plots in the United States.

Dr. L. T. Kurtz, of the University of Illinois agronomy department, said that these particular fields had previously been cropped under an extremely poor management system with no return of fertility or crop residues to the soil. A heavy fertilizer treatment was made to a strip across this area last season.

He termed the results "the most spectacular fertilizer response in Illinois research during the year."

"The addition of fertilizer made the yield almost equal tot hose obtained on the best plots in the Morrow area which have been farmed under good management methods over the years," he said.

Discussing results of other research by Illinois agronomists, Dr. Kurtz expressed the view that there is little difference in crop results between fall or spring applications of nitrogen fertilizer.

Various forms of nitrogen appear to be about equally effective when applied to wheat, he indicated.

"I am beginning to doubt if the differences in efficiency between the various forms of nitrogen are really very large," Dr. Kurtz said. "Under some weather conditions the difference in form would be quite important. I question, however, if this is the case under average weather conditions."

In tests on corn at Urbana, no differences in effect on corn yields were found among various forms of nitrogen, he said. Nor was there any appreciable difference between fall and spring applications.

Dr. Kurtz said that a study of the components of organic matter now under way by the University of Illinois agronomy department may offer the promise of improved soil tests for nitrogen.

Studies on analyses of trace elements from a large number of crop samples on corn and soybean plants grown on a wide variety of soils indicate that no shortages of these elements are yet apparent in Illinois, he reported. Soybean plants from a few locations, however, appear to be low in either manganese or boron.

* * *

Burley tobacco yields were boosted by 760 pounds per acre and the crop value increased by $410 per acre in Kentucky tests when nitrogen was added to a basic potash application and barley and vetch were grown as a winter cover crop on soil high in phosphate.

That was the statement of **Dr. William A. Seay,** University of Kentucky agronomist reporting a paper prepared by himself and Dr. Charles E. Bortner, also an agronomist at the University.

In these tests at Lexington, Ky., some tobacco plots had barley alone as a winter cover crop; others had

CF Staff Photos:

1. George Barley, Middle West Soil Improvement Committee, and M. B. Russell, University of Illinois.
2. George Kingsbury, Kingsbury & Co., G. K. Walton, Darling & Co., Dave Weatherly, D. M. Weatherly Co.
3. George Kingsbury, Kingsbury & Co., and Edward J. Buhner, Buhner Fertilizer Co.
4. Phil Stacker, Land O'Lakes Creameries, and Bill Dible, International Minerals & Chem. Corp.
5. Ted Doyle, National Fertilizer Co., and M. D. Weldon, University of Nebraska.
6. Edwin Aylward, Aylward Fertilizer Co., and F. J. Ronan, Grace Chemical Co.
7. Fred Ioerger, Marion Plant Life Fertilizer Co., and John Sanders, Mississippi River Chemical Co.

barley and nitrogen-fixing vetch. All fields had a 200-pound per acre potash application. Nitrogen was added to some fields at the rate of 50 pounds per acre, and on others at a 100-pound rate.

Yields averaged 1,380 pounds per acre with a $960 value where 100 pounds of nitrogen was added to the potash application on tobacco fields with a barley and vetch cover crop, Dr. Seay reported. This compared with 1,120 pounds worth $550, where potash alone was added and barley was the cover crop.

At a 50-pound nitrogen rate, yields were 1,750 pounds with a value of $915 per acre where barley and vetch were the cover crop, compared with 1,490 pounds, worth $760 where barley alone was the cover crop.

In other tests where a tobacco, corn, wheat and hay rotation was used, the addition of 200 pounds per acre of nitrogen to 100 pounds of potash, increased tobacco yields by 720 pounds per acre and the crop value by $326. Fields that had no nitrogen yielded 1,340 pounds of burley, valued at $624 per acre.

On soils low in phosphorus, the addition of 200 pounds of phosphate per acre to 30 pounds of nitrogen and 200 pounds of potash, increased tobacco yields by 600 pounds per acre and the crop value by $393.

Tobacco yields and quality showed a marked upturn on potash-deficient soil when this nutrient was added in a fertility-exhausting rotation of tobacco, corn, wheat and hay, according to Dr. Seay.

In other tests, where the rotation was burley tobacco one year and grass and legumes two years, tobacco yields were increased 320 pounds per acre, the value boosted $355 and the value per pound increased 14½ cents, when 240 pounds of potash was added along with 80 pounds of nitrogen and 180 pounds of phosphate.

Dr. Seay pointed out that, for high yields and high quality, burley tobacco needs a much larger supply of nutrients from the soil than does corn. And since the tobacco is sold by grade, considerable attention must be given to fertilizing for a quality product. In tests where adequate amounts of balanced nutrients were added, the value per hundred weight increased all the way from $1.50 to $14.50, he said.

* * *

An electric brain named "Iliac" can help a farmer plan his cropping and livestock operations for the highest possible profit whether prices go up or down, an Illinois farm economist told the group.

Earl R. Swanson, assistant professor of Farm Management at University of Illinois, said that it took Iliac just 20 minutes without human intervention to whirl through almost endless combinations of figures and come up with four alternative plans for operating a 320-acre Illinois farm at maximum financial returns, depending on various price levels for corn.

The machine is known as an "electronic digital computer" and is used in a recently developed mathematical technique called linear programming,* Swanson said.

In arriving at its recommendations the electronic brain had to consider factors such as crop rotations, various levels of fertilizer applications, the farmer's starting capital, cropping patterns, limestone, manure and the acreage planted to various crops.

In addition, it had to review detailed data on relationships between crops and livestock, the farm's soil types, available machinery, amount of family help to work the farm, livestock systems, the value of roughage and various market prices for corn, small grains, hogs and cattle.

In another test for a 200-acre farm, Iliac recommended six alternative high-cropping systems for a 10-year phosphate fertility build-up program, where various amounts of cash would be available in the first year.

**For an application of linear programming to mixing fertilizer materials, see "Minimizing the Cost of Fertilizer Mixes", by Earl R. Swanson, page 23 of your October, 1955 issue of* Commercial Fertilizer.

Besides helping solve various agricultural problems, the electronic brain has a wide variety of applications, ranging from military logistics to finding the shortest route for traveling salesmen, Mr. Swanson said.

"The chief limitation of the technique of linear programming," he continued, "it not the technique itself, but the fact that large amounts of information are needed before a problem can be set up for solving.

"Most farmers do not have the detailed information for a thorough job of programming.

"We do not hope by these methods to work out a 'recipe' for large numbers of farms. But we do hope, however, to get a more realistic conception of fitting the individual enterprises and practices into the total farm business.

"Farming is a complex business. And since linear programming permits us to take so many factors into account, it should help us in the long run to make better recommendations to farmers."

* * *

Midwestern farmers are now using insecticide - fertilizer mixtures on about 1,000,000 acres of corn land to help control rootworms, wireworms and other damaging pests, according to **Dr. J. W. Apple,** University of

KEY TO PICTURES

1. C. R. Rex, Woodville Lime Products; Bert Tucker, Sohio Chemical; and W. H. Pierre, Iowa State College.
2. A. J. Ohlrogge, Purdue Univ.; Walter C. Hulburt, USDA; L. W. Swanson, Conn. AES; William F. Farley and W. H. Coffin, Smith Agricultural Chem. Co.
3. G. P. Walker, Purdue Univ.; George Enfield, USDA; M. B. Russell, Univ. of Ill.; and Ward Calland, Soybean Crop Improvement.
4. Carl A. Greenberg, Consumers Co-op of Mo.; W. L. Guithes, Bradley & Baker; and Gordon E. Hoath, Consumers Co-op of Mo.
5. Lewis Eymann, North-Ag Fertilizer; T. J. White, Bradley & Baker; and John Abbott, Ashkum Fertilizer Co.
6. J. Bussart, John P. Eastwood and Loyd L. Stitt, Velsicol Corp.
7. Dale Driday, Nitrogen Div., Allied Chemical & Dye; W. B. Copeland, Smith-Douglass Co.; and H. L. Garrard, American Potash Inst.
8. Leo F. Puhr, S. Dak. State College; Malcolm McVickar, National Plant Food Inst.; J. C. Zubriski and B. L. Brage, S. Dak. State College; and Leonard L. Schrader, Standard Oil Co.
9. R. P. Cloud, Spencer Plant Foods; Wendell Glaspey, Blue Valley Fertilizer Co.; A. C. Caldwell, Univ. of Minn.; and E. R. Duncan, Iowa State College.
10. A. C. Caldwell and C. A. Simpkins, Univ. of Minn.; George N. Hoffer, Olin Mathieson Chemical Corp.; and W. P. Martin, Univ. of Minn.
11. Jerry Mitchell, National Fertilizer Co.; L. H. Smith, Purdue Univ.; and R. E. Bennett, Farm Fertilizers.
12. Howard Lathrope, Nitrogen Div., Allied Chemical & Dye; F. A. Houk, Federal Chemical Co.; William A. Seay, Univ. of Ky.; and Ray White, Spencer Chemical Co.
13. George C. Smith, Univ. of Mo.; Warren Huff and Wendell Hoover, Jr., Ashcraft-Wilkinson Co.; and John Falloon, Univ. of Mo.
14. J. C. Zubriski, S. Dak. State College; Frank Nelson, Rath Packing Co.; and A. E. Peterson, Univ. of Wisc.
15. B. P. Redman, Farmers Fertilizer Co.; J. R. Sargent, Federal Chemical Co.; W. F. Farley, Smith Agricultural Chemical Co.; and H. E. Wood, Farmers Fertilizer Co.
16. Ove F. Jensen, E. I. du Pont, and G. K. Walton, Darling & Co.
17. Bob Mason, Arkell & Smiths; Ben Emkes and Charles Everhart, Buhner Fertilizer Co.; and Tom L. Jones, Arkell & Smiths.
18. Garth Volk, Ohio State Univ.; W. H. Leathers, R. A. Culbertson and Tracy Adcock of Swift & Co.
19. William Thorne, Hydrocarbon Products; C. E. Martin and Roy Roughton, International Minerals & Chemical Corp.; and Charles Durham, Ashkum Fertilizer Co.
20. C. E. Workman, Virginia - Carolina Chemical Corp.; George E. Scarseth, American Farm Research Bur.; and Arthur R. Mullin, Indiana Farm Bureau Coop.
21. W. P. Martin and Harold Jones, Univ. of Minn., and Myron Keim, Virginia-Carolina Chemical Corp.
22. Don Cook and E. Powel, Illinois Farm Supply, and Joseph Lantner, Central Farmers Fertilizer Co.
23. G. O. Powell, F. S. Royster Guano Co., and Robert Fitzgerald, Smith-Douglass Co.
24. C. A. Johnson and Phil Stocker of Land O'Lakes Creameries.
25. Werner Nelson, American Potash Inst., and Dick Balser, Spencer Chemical Co.
26. W. E. Smith, A. N. D'Aubert and W. J. Klossner of Swift & Co.
27. Charles Goodale, Commercial Solvents Corp., and G. P. Walker, Purdue Univ.
28. J. D. Stewart, Jr., Federal Chemical Co., and C. E. Evans, USDA.
29. Dean Gidney, U. S. Potash Co., and Bob Gibbs, Grand River Chem. Div., Deere & Co.

Wisconsin entomologist, who reported that more than 200,000 tons of insecticide-fertilizers were used on American farms last year—34 per cent more than in 1954.

Dr. Apple reported that corn yields were increased as much as 39 bushels per acre and lodging reduced about 90 per cent in some 1955 Wisconsin tests where insecticides were added to starter fertilizers to control rootworm infestations.

Varying amounts of heptachlor, aldrin and chlordane were used in fertilizers such as 5-20-20 and 4-16-16, to provide concentrations of one-fourth to one pound per acre in the various tests.

Some earlier tests in Iowa had indicated that insecticides in starter fertilizers containing aldrin and chlordane reduced rootworms 87 per cent and increased yields 28 per cent.

Control of wireworm ranks next to rootworm in the use of insecticide fertilizer in the Middle West, Dr. Apple said. Wireworms can damage a wide variety of plants such as small grains, potatoes, lima beans and other small acreage crops. Practically all corn fields have a few wireworms and occasionally heavy infestations cause costly damage.

The use of insecticide-fertilizers on lima beans increased survival of plants by 145 per cent where two pounds of aldrin was used to combat wireworms. Half a pound of aldrin increased survival by 114 per cent. A similar amount of heptachlor gave about the same results.

Potential future use of insecticides in fertilizer, said Dr. Apple, will be governed only by the total sale of all fertilizers.

"Investigators are finding an ever-increasing need for the elimination of soils insects," he concluded, "and fertilizer, whether spread broadcast or used as a starter, can provide an excellent carrier for insecticides."

* * *

The use of fertilizer - insecticide mixtures on American farms has more than doubled since 1953, a chemical engineer told the group.

Victor C. Smith, of the Velsicol Chemical Corp., Chicago, said that farmers use about 200,000 tons of fertilizer-insecticide.

Farmers are using more fertilizer-insecticides, Mr. Smith said, because:

1—These mixtures provide almost perfect control of damaging soil insects throughout the growing season.

2—By using these mixtures, farmers save time before spring planting when every hour is critical.

3—Farmers save an estimated $1.40 per acre by applying fertilizer and insecticide in one application.

4—The one application of fertilizer and insecticide together helps certain farmers who wish to take advantage of the winter soil conditioning and do not want to work their soil more than a minimum number of times.

Mr. Smith reported that new methods and improvements have been developed for adding pesticides to fertilizer that make the process less expensive for plant food manufacturers, easier and quicker to handle and uniform in results.

* * *

Irrigation as a drought-proofing measure gave 60 bushel per-acre corn yields in Nebraska's damaging 1955 dry season, while corn in non-

CF Staff Photos:

1. Misses Anne Mikul and Pat Davis of Middle West Soil Improvement Committee.
2. Zenas Beers, Middle West Soil Improvement Committee secretary, and Program Chairman Kermit C. Berger, University of Wisconsin.
3. Vincent Sauchelli, Davison Chemical Co., and F. W. Quackenbush, Purdue University.
4. John Falloon, University of Missouri, and Francis Best, Spencer Chemical Co.
5. John D. Zigler, International Minerals & Chemical Corp., Kirk Wagenseller, Swift & Co., and Ralph Fraser, Summers Fertilizer Co.
6. Rogers Bullard, Inland Steel Co., Jack Turner and Jerry Lyons, Turner Plant Food Co.
7. E. H. Carbon, N. S. Koos & Son Co., Jim Mills, Nitrogen Div., Allied Chemical & Dye., Mrs. D. W. Anderson, N. S. Koos & Son Co., and Hugo Reimer, Nitrogen Div., Allied Chem. & Dye.
8. Howard Lathrope and E. M. Harper of Nitrogen Div., Allied Chemical & Dye, and Myron Lecher of Aylward Fertilizer Co.
9. Walter Harding, Federal Chemical Co., Dean Keller, Nitrogen Div., Allied Chemical & Dye, and C. R. Stillings, Federal Chemical Co.
10. R. B. Ellsworth, consulting chemical engineer, E. C. Kapusta, U. S. Potash Co., and Wendell Glaspey, Blue Valley Fertilizer Co.
11. James A. Naftel, Pacific Coast Borax Co., and George D. Scarseth, American Farm Research Bureau.
12. Bob Borg, National Potash Co., D. L. Peterson, Ashkum Fertilizer Co., and Len Gopp, International Minerals & Chem. Corp.

irrigated areas averaged only 9 bushels per acre, **Dr. Harold F. Rhoades,** University of Nebraska agronomist reported. "These results point out clearly the importance of an adequate moisture supply for corn production.

"However, it seems evident to many that the average yield under irrigation should be greater than 60 bushels."

Dr. Rhoades said that failure to get more than 60 bushels per acre was due in large measure to the failure of many farmers to follow good management practices, including proper fertilization, and a stalk population sufficient to use all the available moisture and nutrients.

"A successful irrigation farmer," he said, "must combine all the good production practices to obtain high corn yields so that satisfactory returns may be realized from the added cost of irrigation."

In general, adequate fertilization for corn in Nebraska means supplying nitrogen fertilizer, Dr. Rhoades said. Phosphate is needed in addition to nitrogen in some cases, and a complete fertilizer mixture of nitrogen, phosphate and potash is needed in a few instances.

Corn yields were increased nearly 100 bushels per acre in some Nebraska tests, Rhoades said, when 160 pounds of nitrogen per acre was added on high productivity soils well supplied with phosphate and potash and good irrigation practices were followed.

In some Nebraska tests, yields of irrigated corn were nearly 100 bushels greater when 160 pounds of nitrogen fertilizer per acre was added on high productivity soils well supplied with phosphate and potash, than on low productivity soils to which no nitrogen was added, according to the speaker.

Dr. Rhoades reported that the acreage under irrigation in Nebraska has nearly trebled since 1939. The 1955 irrigated acreage was 1,440,000 acres, compared to 523,000 acres 16 years ago. There has been an appreciable expansion of irrigation in other Corn Belt states, he said. A considerable percentage of the water now used for Nebraska irrigation comes from underground supplies. Altogether, 11,722 irrigation wells were reported in the state at the beginning of 1955.

In 1952 corn yields as high as 153 bushels per acre were obtained in some Nebraska tests from 6 irrigations supplying 14.2 inches of water. Yields of 144 bushels per acre came from the use of 3 irrigations supplying 7 inches of water at tasseling and silking time. Without any irrigations yields were 69 bushels per acre. The soil was wet to a depth of 6 feet at planting time.

Under moisture stress, the corn plant's nitrogen intake was influenced in a manner similar to dry matter production, Dr. Rhoades continued.

The corn plant's intake of phosphate practically ceased when moisture stress became severe, he said; and there was a tendency for moisture stress to decrease the phosphorous content of the plant. Potash intake ceased when moisture stress first became noticeable, he reported. At that time there was essentially as much potash in the "low" as in the "high" moisture plants, or 76

CF Staff Photos:

1. Maurice Lockwood, International Minerals & Chemical Corp., and J. R. "Dugan" Taylor, Grand River Chemical, Div. Deere & Co.
2. E. M. Kolb, American Potash & Chem. Corp., and H. B. Mann, American Potash Institute.
3. Stanley C. Smith, Darling & Co., and G. O. Middleton, Virginia-Carolina Chem. Corp.
4. Elwyn C. Weiss, Sinclair Chemicals, and Marvin Luers, Jasper County Farm Bureau Coop.
5. Ralph Huffman, Huff & Assoc., H. E. Wood, Farmers Fertilizer Co., Leon Baker, Snyder Chem. Co., and Pete Redman, Farmers Fertilizer Co.
6. Floyd W. Smith, Kansas State College, and Phillip E. Lyness, Smith-Douglass Co.
7. R. M. Howe, Howe, Inc., and Cash Cahill, National Potash Co.
8. Leo Orth, Minnesota Farm Bureau, and Angus Taylor, Chemical & Industrial Corp.
9. Warren Huff and Wendell Hoover, Jr., Ashcraft-Wilkinson Co.
10. H. C. Doellinger, O. M. Scott & Sons Co., and H. B. Tatum, U. S. Phos. Products Div., Tenn. Corp.
11. R. M. Cook, Michigan State College, and Herb Garrard, American Potash Institute.
12. Russell Pisle and H. H. "Bert" Tucker, Sohio Chemical Co.
13. K. D. Morrison, Philipp Bros. Chemicals, and Henry J. Coleman, Sohio Chemical Co.
14. T. E. Bradley, Potash Co. of America, and Gene Van Deren, Bluegrass Plant Foods.
15. Chuck Trunkey, Middle West Soil Improvement Committee, and Jerry Detweiler, Crystal Chemical Co.
16. Kaspar Peter, Phillips Chemical Co., and E. D. Banktson, Farmers Union Central Exchange.

per cent of the total potash used by the "high" moisture plant in the entire growing season.

* * *

Final feature of the opening day was presentation of new and recent movies on pertinent topics, followed by adjournment. There was no formal program for the evening.

Next morning another business session featured talks on the changing fertilizer picture, acceptance of new ideas by farm folk, research in another corn belt state, and presentation of the agronomists' recommendations for ratios and grades.

* * *

Fertilizer is the farmer's best buy today, declared **Dr. Russell Coleman,** executive vice president of the National Plant Food Institute.

"While the cost of all production items a farmer buys has increased 125 per cent since 1935," said Dr. Coleman, "the cost of plant food has risen only 13 per cent.

"Putting it another way, a bushel of corn today buys more plant food than it did 25 years ago. It took 35 bushels to buy a ton of fertilizer then. It takes only 29 bushels today.

"The same is true of wheat. It took 25 bushels to buy an average ton of plant food in 1930; today it takes only about 19 bushels."

Dr. Coleman said fertilizer today has more crop-building power. In the past five years, he said, the industry has increased its concentration of plant food per ton of fertilizer by almost 23 per cent.

"With the decline in net farm income," he said, "farmers are placing special emphasis on cost and value. Our product is the farmer's best buy."

Dr. Coleman said that at present and in the immediate future, research "know-how" must be sold to farmers on the basis of dollar returns.

Recent Ohio research, he said, indicates that corn produced without fertilizer, and sold at $1.50 per bushel, could yield $19.50 profit; but the same corn sold at $1 would yield no profit.

Corn with adequate fertilizer could yield $52.60 profit, if sold at $1.50 per bushel; corn at $1 per bushel would yield $15.10 profit.

"This emphasizes the important place proper fertilization plays in producing net profit," Dr. Coleman pointed out. "And it particularly emphasizes the need for farmers to use fertilizer when corn prices are relatively low."

Other Ohio State University research data indicated that without fertilizer, corn producing 39 bushels per acre costs $1 per bushel to produce, whereas with adequate fertilizer, a 75-bushel yield would cut the cost of production to 80 cents per bushel.

He expressed alarm over the number of comments "from responsible people in government—even in Congress—who state that research is responsible for our present surpluses in agriculture."

"How ridiculous this sounds to those who know that only through the application of research can farmers possibly stay in business," he said. "Yet for the protection of our agricultural research programs, we must convince those who hold the purse strings."

"Admittedly this requires a sales effort on the part of Land-Grant colleges. In many states you already have the information to do this sale job," he told the research men.

Dr. Coleman cited recently published Missouri data which shows that corn profits can be increased from less production on fewer acres.

"In effect, these data show that Missouri farmers by using fertilizers along with other good soil management practices can cut the average cost of producing corn from 84 cents to 58 cents per bushel," he said.

"If this could be accomplished, Missouri farmers could realize more net income from 120-million bushels of corn produced properly, than they now receive from 140-million bushels."

* * *

Newspapers, farm magazines, radio, TV and other mass media are major factors in making farm people aware of new ideas and practices that will cut their costs of production, increase crop yields per acre, speed work, build profits, or save time, money and labor.

These were the findings of two Iowa State College rural sociologists, **Joseph M. Bohlen** and **George M. Beal,** in a two-man flannel-graph presentation.

People go through five stages in learning about and adopting new ideas and improved practices, they reported.

These are: "awareness," when a farmer learns of the existence of the idea; "interest," when he seeks more information about it; "evaluation," when he weighs its practical value to him; "trial," when he applies the practice on a small scale; and "adoption," when he accepts the idea for continued use.

Agricultural leaders are concerned with narrowing the time gap between early and late adoption of recommended practices, the sociologists pointed out.

"The average time span from awareness to adoption of hybrid seed corn in Iowa was seven years," Mr. Bohlen and Mr. Beal said. "Adoption of most other hybrid seeds has come more rapidly. Changes involving new skills or techniques usually require longer time."

Mass media make their greatest impact in the "awareness" and "interest" stages, according to the Iowa specialists. Neighbors and friends are most important as information sources in the "evaluation" stage. In the "trial" stage agricultural agencies, college extension departments, bulletins, neighbors and friends are important; dealers and salesmen are important, too, in this stage when commercial products are involved.

They reported also that:

The more education an individual has, the more likely he is to adopt new farming practices. Those with high school training and above, tend to adopt new practices earlier than those with less formal training.

Farmers who have children in 4-H clubs or vocational agriculture courses tend to adopt more improved practices than others. Participation in adult college extension programs is positively related to adoption of new practices.

Young farmers tend to be more favorable toward new practices, but are not always in position to put their ideas into operation.

Farm families which share farm income equitably between father and son, tend to be earlier adopters of new ideas than families in which the father retains control of the farm.

* * *

How radioactive phosphorus — a development of the atomic age—is giving research specialists new clues about how much of the nutrients in a plant come from fertilizer and how much is supplied by the soil, was revealed by **Dr. A. C. Caldwell,** University of Minnesota soils specialist, finalist on the morning program.

By "tagging" some of the phosphorus in fertilizer to make it radioactive, he said, it is possible to trace the fertilizer from the soil to the plant and find out how much of the plant phosphorus came from the fertilizer.

Dr. Caldwell reported that 35 percent of the phosphorus in alfalfa plants came from fertilizer in Minne-

sota tests when established meadows were top-dressed with the equivalent of 266 pounds of concentrated superphosphate per acre. This application boosted yields by 39 per cent.

When the equivalent of 90 pounds of concentrated superphosphate per acre was added, about 19 per cent of the alfalfa plants' phosphorus content was traceable to the fertilizer. Yields increased about 45 per cent compared to unfertilized plots.

Adding nitrogen helped increase the uptake of phosphorus in most crops studied, according to Dr. Caldwell. This was particularly true of corn, he said.

Early maturing inbred lines of hybrid corn used larger amounts of fertilizer phosphorus than did most of the medium or late maturing lines, he added.

Dr. Caldwell reported that other tests have measured the residual or "carryover" amount of phosphorus that remains in the soil for plant use after crops have been harvested.

In one series of tests in Southern Minnesota, five different forms of phosphorus were added to various plots at the rate of 40 pounds of P_2O_5 per acre per year for six years. These included ordinary superphosphate, calcium metaphosphate, phosphoric acid, fused tricalcium phosphate and rock phosphate. On some plots, rock phosphate was also added to the rate of 100 pounds of P_2O_5 per acre per year.

The results showed increased yields of first-cut legume hay over the entire six years from the phosphorus added in the various fertilizers, with the exception of rock phosphate added at the smaller rate. Superphosphate boosted hay yields three-fourths of a ton per acre. The other phosphorus forms gave smaller

CF Staff Photos:

1. National Plant Food Institute's Executive Vice President Russel Coleman.
2. H. F. Rhoades of University of Nebraska.
3. Don Cook of Illinois Farm Supply and Dwight Sanders of Swift & Co.
4. George Beal and J. M. Bohlen of Iowa State College illustrate with flannelboard.
5. D. A. Williams and Leo Orth of Minnesota Farm Bureau.
6. Grant Davis, Pacific Coast Borax Co., and James Hart, Spencer Chemical Co.
7. E. A. Cleavinger, Kansas State College.
8. J. C. Engibous, International Minerals & Chemical Corp.; W. P. Martin, Univ. of Minn.; and H. H. Hatson, Minnesota Mining & Manufacturing Co.
9. D. G. Hanway, Univ. of Nebr., and John Hanway, Iowa State College.
10. B. M. Machen, Lion Oil Co.
11. Zenas Beers, MWSIC, and C. J. Chapman, Univ. of Wisc.
12. R. P. Koos, Kenosha, Wisc.
13. Gordon Ryder, Ohio State Univ.
14. A. H. Fahrenkrog, Illinois Farm Supply, and C. Lawton, American Potash & Chemical Co.
15. J. F. Davis, Mich. State Univ.
16. F. H. Lucas and Lewis B. Williams of Federal Chemical Co.
17. Program Chairman K. C. Berger of Univ. of Wisc. and MWSIC President W. M. Newman, Price Chemical Co.
18. A. H. Bowers of Swift & Co. and F. W. Quackenbush of Purdue Univ.
19. R. A. Garn, Farm Bureau Coop., and Charles R. Martin, Miami Fertilizer Co.
20. C. E. Littlejohn, U. S. Potash Co.
21. John H. Wiley, TVA, and Harold E. Jones, Univ. of Minn.
22. E. R. Swanson and L. T. Kurtz of Univ. of Ill., and J. B. Peterson, Purdue Univ.

STATE AGRONOMISTS' SUGGESTED MINIMUM FERTILIZER GRADE NEEDS OF THE MIDDLE WEST FOR THE YEAR BEGINNING JULY 1, 1956*

Straight materials supplying nitrogen, phosphate and potash are also needed. Minor and secondary elements as materials and in mixed fertilizers are required in localized areas.

RATIO	ILL.	IND.	IOWA	KAN	KY.	MICH.	MINN.	MO.	NEBR.	N. DAK.	OHIO	S. DAK.	WISC.
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1:2:3					5-10-15						5-10-15		
1:2:2		8-16-16	8-16-16		5-10-10	8-16-16	8-16-16	8-16-16			6-12-12		8-16-16
1:2:1			10-20-10	10-20-10		10-20-10	10-20-10	12-24-12	10-20-10	10-20-10		10-20-10	
1:1:3					6- 6-18								
1:1:1	10-10-10	10-10-10	10-10-10	10-10-10	10-10-10	10-10-10	10-10-10	10-10-10		10-10-10	10-10-10		10-10-10
1:8:0		5-40- 0											
1:4:0	8-32- 0	8-32- 0	8-32- 0	8-32- 0		8-32- 0	8-32- 0	8-32- 0	8-32- 0	8-32- 0		8-32- 0	
1:2:0	10-20- 0		10-20- 0	10-20- 0		10-20- 0	10-20- 0	10-20- 0	10-20- 0	10-20- 0		10-20- 0	
1:1:0	15-15- 0		15-15- 0	15-15- 0			15-15- 0		15-15- 0	15-15- 0		15-15- 0	
2:1:1		14- 7- 7				14- 7- 7					14- 7- 7		
2:2:1										12-12- 6			

*The production of higher grades of the suggested ratios is encouraged.

The following changes in grades and ratios have been suggested for future consideration: 1-3-6 (3-9-18) to 1-2-4 (5-10-20); 1-3-9 (3-9-27) to 1-2-8 (4-8-32); 0-1-3 (0-10-30) to 0-1-4 (0-10-40); 1-2-3 (5-10-15 to 1-2-4 (5-10-20) and 1-3-6 (3-9-18)

increases. Rock phosphate applications at a 40-pound P_2O_5 rate resulted in a slight decrease in hay yields. When this application was increased to 100 pounds, hay yields went up about one-fifth of a ton.

Available phosphorus in the soil was as much as 100 per cent greater in plots receiving superphosphate, calcium metaphosphate, phosphoric acid, and fused tricalcium phosphate than in those receiving rock phosphate, or no fertilizer at all.

In other tests, the long continued use of superphosphate and manure had doubled or trebled the available phosphorus in the soil, Dr. Caldwell said. On some of the plots, superphosphate, rock phosphate and manure had been applied for more than 40 years and in others these applications had been made for 20 years and then discontinued.

The residual or "carryover" benefit was highest on plots receiving superphosphate, next highest from superphosphate and manure and third highest from manure. Little residual effect was recorded from rock phosphate or a combination of rock phosphate and manure.

* * *

At the completion of Dr. Caldwell's presentation of research data, the new recommendations for fertilizer grades and ratios were distributed and the gathering recessed for lunch.

The afternoon session, newly-added to the program, was devoted to a fertilizer mechanization conference which drew an additional influx of delegates from the various farm equipment manufacturers. D. A. Williams, general manager of Minnesota Farm Bureau Service Co., St. Paul, was moderator during this portion of the meeting.

To begin the discussion were summary statements on specific phases of mechanization by men specially selected in advance to review each topic. M. D. Sanders, director of research for the Plant Food Division, Swift & Co., Chicago, led off with a statement on "Solid Fertilizers." R. B. Ellsworth, consulting chemical engineer and president of Ellsworth Equipment & Engineering Co., Indianapolis, spoke on "Complete Liquids," followed by J. D. Cook of the Fertilizer Division, Illinois Farm Supply Co., Chicago, with comments on "Bulk Spreading." A. J. Ohlrogge, associate professor of Agronomy at Purdue University, Lafayette, Ind., completed the preliminary statements with his discussion of "Fertilizer Placement."

Then these men were joined by another quartet of experts to fill the panel for the forum discussion that followed. The four additional panelists were: Vincent Sauchelli, chief agronomist for Davison Chemical Company Division of W. R. Grace & Co., Baltimore; George Scarseth, director of American Farm Research Assn., Lafayette, Ind.; R. P. Thomas, technical service advisor for the Plant Food Division of International Minerals & Chemical Corp., Chicago; and George E. Smith, professor of Soils at University of Missouri, Columbia. After an intense session of questions, answers, discussions and idea-exchange, the meeting was brought to adjournment.

Dr. Baver's Soil Physics Text Reprinted

Dr. Leonard D. Baver's authoritative book Soil Physics is now off the press in a third edition, the Hawaiian Sugar Planters' Association reports.

Dr. Baver, who is now director of the H.S.P.A. Experiment Station, was director of the North Carolina Agricultural Experiment Station in 1940 when the book was first published.

The new edition has two new chapters in which Dr. Baver uses basic work done in the Hawaiian sugar industry to illustrate the subject of irrigation and drainage.

Meanwhile the book's second edition has just been translated and published in Tokyo in the Japanese language.

SOUTHERN AGRICULTURAL WORKERS

From the papers given at the joint meeting, February 6-8 in Atlanta, of the Association of Southern Agricultural Workers and the Southern section of the American Society of Agronomy we present here a group of the abstracts. These are just a few of the worthwhile presentations made, and we plan to run other abstracts in subsequent issues.

Elected were: Willard M. Fifield, University of Florida, S.A.W. Chairman; J. Fielding Reed, Chairman, ASA Southern section.

Initial and Residual Effectiveness of Rock Phosphate in a Rotation*

*E. C. Doll and H. F. Miller***

Rock phosphate and concentrated superphosphate have been compared as sources of phosphorus since 1949 on Tilsit silt loam. A three-year rotation of corn, wheat, and grass-legume hay was used, but only one crop was grown each year. All of the phosphorus was broadcast in 1949, one-half in the spring for the corn and one-half in the fall for wheat. No additional phosphate was applied Uniform applications of 60 pounds per acre of nitrogen and 60 pounds of potash were broadcast on all plots for the corn, and 30 pounds of nitrogen and 30 pounds of potash were broadcast for the wheat. When the experiment was begun, soil tests showed pH 5.1, 3 pounds of available phosphorus (modified Truog extraction), and 140 pounds of exchangeable potassium per acre. Ground limestone was applied to the entire area at the rate of 2 tons per acre prior to starting the experiment.

Phosphate treatments included concentrated superphosphate at 60 and 120 pounds of P_2O_5 per acre, rock phosphate at 120 and 240 pounds of P_2O_5 per acre, and concentrated superphosphate at 40 pounds plus rock phosphate at 200 pounds of P_2O_5 per acre. The 120-pound application of concentrated superphosphate gave a significant yield response (in all cases) except for the hay crop in 1954, but the 60 pound rate gave significant increases for only the first three years of the experiment. The rock phosphate did not give significant yield increases during the first three years, but after 1952, the increases from both rates were significant except for the 1954 hay crop. In 1953 and 1955, the increases due to 240 pounds per acre of P_2O_5 as rock phosphate were significantly greater than from 120 pounds per acre of P_2O_5 as concentrated superphosphate. Where concentrated superphosphate and rock phosphate were applied together, significant yield increases were obtained for all crops except the 1954 hay crop. Yields for the first three years were nearly the same as on plots treated with 60 pounds of P_2O_5 as concentrated superphosphate per acre and for the last four years were comparable with those from 240 pounds per acre of P_2O_5 as rock phosphate.

*Conducted in cooperation with the Tennessee Valley Authority.

**The investigation reported in this paper is in connection with a project of the Kentucky Agricultural Experiment Station and is published by permission of the Director.

* * *

Fertility and Lime Status of Mississippi Soils as Indicated by Soil Test Results

L. E. Gholston
Mississippi Agricultural Extension Service, State College, Mississippi

During the period 1950-54 the Soil Testing Laboratory analyzed 97,856 soil samples representing 573,309 acres of cropland for 15,175 Mississippi farmers. Of the samples tested, 35% were from pastures, 31% from cotton land, 15% from corn land, 9% from truck crops, and 11% from other crops.

With regard to soil acidity, 4% of the soil samples had a pH of 4.9 or less, 27% a pH of 5.0 to 5.4, 37% a pH of 5.5 to 5.9, 19% a pH of 6.0 to 6.4, 10% a pH of 6.4 to 6.9, and 3% a pH of 7.0 or above. One third of the crop land in the state was found to need lime for all crops and more than two-thirds of the land to need lime for legumes.

Of the soil samples analyzed during this period, 64% were low in available phosphorus, 18% medium, and 18% high. The test for potassium showed 51% were low, 39% medium, and 10% high.

Data for the period 1953-54 during which time 54,000 samples were tested indicated that the residual levels of phosphorus and potash in cotton soils were slightly higher than in corn soils. This was considered to be a reflection of past fertilization history. For the same period, soil test results indicated that a mixed fertilizer of 1:1 ratio of P_2O_5 to K_2O was needed on 60% of the soils, one of 2:1 on 24% and one of 1:2 on 16%. According to these data, it would appear that only three basic P_2O_5: K_2O ratios are needed in mixed fertilizers to provide appropriate rates of these plant nutrients for crops.

Further, the soil test summary showed that farmers, on the average, are sampling larger areas less intensively than recommended, an indication of need for more emphasis on proper sampling in the educational program.

To receive the most efficient service from a soil testing program, farmers should avoid, if possible, collecting and sending samples for analysis during the peak of the testing season which occurs in February and March of each year. It would be desirable to collect samples for spring planted crops in late fall and early winter.

* * *

Inter-Relations of Irrigation, Soil Fumigation, and Fertilization of Crops Grown on Lakeland Sand

T. C. Peele and R. H. Hawkins[1]

Irrigation experiments with cotton, corn, tobacco and sweet potatoes including soil treatment for nematode control using the row method were conducted in 1954 and 1955 at the Clemson College Sandhill Experiment Station near Columbia, S. C. A very severe drouth occurred in 1954 while the rainfall in 1955 was unusually favorable. The nematode treatment in 1954 caused large increases in yields of cotton, tobacco and sweet potatoes on the irrigated as well as the unirrigated plots. Irrigation alone was better than nematode treatment alone but a combination of the two gave yield increases over irrigation alone as

[1] Soil Scientist and Associate Soil Scientist, S. C. A. E. S., Clemson, S. C. and Sandhill Exp. Sta., Columbia, S. C.

follows: cotton 37 percent, tobacco 71 percent, sweet potatoes, all grades 31 percent, and number 1 grade 69 percent. Corn yields were not affected by the soil fumigation treatments but were greatly increased by irrigation.

In 1955, the nematode treatment produced relatively small increases in cotton and tobacco yields and most of this effect was on the unirrigated plots. It had no effect on yields of sweet potatoes and corn. Yields from the irrigated plots in 1955 were appreciably higher than from the unirrigated plots despite very favorable rainfall. The per acre yields were as follows with the irrigated plots listed first in each instance: corn 136 and 91 bushels, cotton 1970 and 1520 pounds, tobacco 2180 and 2090 pounds and sweet potatoes 285 and 250 bushels.

An experiment comparing common and coastal Bermuda grass with and without irrigation at four nitrogen levels was conducted at this station in 1954 and 1955. The nitrogen was applied in split applications at rates of 100, 300, 500 and 700 pounds of N per acre per year. During 1954 the yields from the unirrigated plots were very low due to lack of rainfall and were not appreciably affected by the different nitrogen rates. The 1954 hay yields in pounds per acre from the different nitrogen rates with the low rate listed first in each instance were: unirrigated common Bermuda 430, 650, 450, 600; unirrigated coastal Bermuda 1720, 2420, 2410, 2490; irrigated common Bermuda 4590, 11100, 11360, 13710; and irrigated coastal Bermuda 7520, 15350, 16150, 16450. In 1955 with favorable rainfall the following yields were obtained: unirrigated common Bermuda 3950, 6690, 7410, 7900; unirrigated coastal Bermuda 7270, 11540, 13240, 14200; irrigated common Bermuda 7180, 12110, 16550, 19310; irrigated coastal Bermuda 7680, 13220, 19070, and 19340.

Price Of Farm Land At Record High

Farm bargains are scarce. As is shown by all reports, the average price of farm land per acre is at a new all-time high. The advance during the 18 months ending in midyear 1955 overcame an earlier mild decline and carried farm acreage prices into new high ground.

"more than two-thirds of the farms and tracts sold in 1954-55 were bought by farmers. This was a slightly higher proportion than a year earlier. Farmers who already owned some land were the predominate class of buyers."

1. Dr. W. L. Parks, Tennessee Agricultural Experiment Station, Knoxville, Dr. Fielding Reed, American Potash Institute, Atlanta.
2. Dr. Firman E. Bear, Soil Science, New Brunswick, N. J.
3. Dr. H. B. Mann, American Potash Institute, Russell Coleman, National Plant Food Institute, both from Washington.
4. Dr. T. H. Taylor, Kentucky Agric. Experiment Station, Lexington.
5. O. H. Long, University of Tennessee, Knoxville, Frank Boyd, Virginia-Carolina Chemical Corp., Montgomery.
6. Dr. R. P. Thomas, International Minerals & Chemical Corp., Chicago, P. H. Grissom, Delta Branch Agric. Experiment Station, Stoneville.
7. Dr. Fred H. Hull, University of Florida, Gainesville, Cooper Morcock, Nitrogen Div., Allied Chemical & Dye Corp., Atlanta.
8. Glenn Burton, USDA, Tifton, F. L. Fisher, Texas A & M College, College Station.
9. Gordon Cunningham and Lawrence Smith, both with Tennessee Corp.
10. W. R. Paden, J. G. A. Fiskel, Fla. Agric. Experiment Station, Gainesville.
11. Lyton Boyle, Georgia Agric. Experiment Station, W. L. Prichett, University of Florida, W. K. Robertson, Agric. Experiment Station, both from Gainesville.
12. Sam Thornton, F. S. Royster Guano Co., Norfolk.
13. Dr. A. A. Nikitin, Tennessee Corp., East Point.
14. Dr. Nathan Gammon, Jr., Florida Agric. Experiment Station, Gainesville.

ZINC DEFICIENCY OF CORN IN TENNESSEE

By
Eric Winters and W. L. Parks

Zinc deficiency of corn in Tennessee has been observed most frequently on soils naturally high in phosphate, such as the Maury and Armour of the Central Basin area.

Symptoms are most pronounced where heavy applications of limestone have been made on high phosphate soils; appear less often in other soil regions. Soil series most commonly involved outside the Central Basin area are the Hartsells and Tilsit of the Cumberland Plateau; and the Dickson, Mountview, and Lawrence of the Highland Rim. Soil samples collected from many of the fields in which the deficiency symptoms on corn were observed showed high to medium-high available phosphate, and pH of 6.3 or above.

Deficiency Symptoms

The sequence of development of zinc deficiency symptoms on corn is characteristic. A few days after emergence, the second leaves show a yellow streaking. As the plant grows older, the chlorosis becomes definitely interveinal and appears as a white to yellow striping; the tips, margins and sheaths of the older leaves begin to develop a purplish color. The plants are smaller in size (both tops and roots) than normal plants of the same age. If the deficiency is severe, new upper leaves show extremely pronounced chlorosis and the older leaves, now definitely purple, begin to die and turn brown. The entire plant then may die or, if it survives, will show severe stunting and be barren. If deficiency is moderate to slight, only the lower leaves of the plant may be affected, and new upper leaves will develop normally. The purple color is less pronounced in such cases, and stunting of growth may hardly be noticeable by tasseling time.

If stalks are split down the middle, the lower nodes will show a dark purplish discoloration. This discoloration is almost black in severe cases.

Replicated field experiments were initiated in 1951 to study the response of corn to zinc, applied at different rates and in different ways. Areas were selected where corn chlorosis had been observed in previous years. Rates of zinc sulphate mono-hydrate ranged from 5 to 30 pounds per acre, which are equivalent to 1.8 to 10.8 pounds of zinc per acre. In the majority of experiments the zinc sulfate was mixed with nitrogen and potash fertilizers and applied in the row or in bands at planting time. In a few experiments, zinc sulfate was applied as a sidedressing to the corn after the leaves had developed definite chlorosis. Spray applications of zinc sulfate also were used on chlorotic corn in a few experiments.

The work reported in this article was supported in part by a grant from the Tennessee Corporation. This material appeared originally in Tennessee Farm and Home Science published by College of Agriculture, Experiment Station; Extension Service of University of Tennessee.

Corn at right received 20 lbs. $ZnSO_4 \cdot H_2O$ per acre banded near the row. Corn in the check received no zinc, but the same amounts of N P and K as did the tall corn.

Experiment Results

In 1951, 10# of zinc sulfate per acre gave approximately the same corn yields as did 30# of zinc sulfate. Both rates when applied at planting prevented appearance of deficiency symptoms in most experiments, though occasionally early in the season there were a few symptoms in plots treated at the lower rate. It would appear that 10# per acre was an adequate rate under the conditions studied.

Sidedressings of zinc sulfate were generally of little benefit to corn showing deficiency symptoms. The reason may be related to limited or delayed uptake of zinc by the roots.

Spray applications did increase corn yields, but to a lesser degree than soil applications at planting. The chlorotic leaves seemed to be injured by the spray and often died, though the new leaves that did emerge were not chlorotic. In general, normal leaves did not show any spray injury. Of the methods used in these studies, soil applications near or in the row at planting time was the most satisfactory method of fertilizing corn with zinc.

Corn Yields as Affected by Zinc Fertilization (1954)

Treatment	Zinc Equiv. lbs./A	Yield bu./A
Check	0	7.5
5 lbs. $ZnSO_4 \cdot H_2O$/A	1.8	27.6
10 lbs. $ZnSO_4 \cdot H_2O$/A	3.6	36.1
20 lbs. $ZnSO_4 \cdot H_2O$/A	7.2	35.9
L.S.D. 5%		9.1

Hartsells loam; pH 6.4; available phosphate-High

Zinc deficiency of corn has been brought about on experimental areas by heavy applications of limestone on soils high in phosphate. In one experiment on a Maury soil of pH 7.0 limestone was applied at rates up to 5 tons per acre, and the severity of zinc deficiency increased with the increasing rates of liming. In the same experiment, dolomite, a by-product from a zinc mining operation, was also used as a liming material. The dolomite did not cause the development of zinc deficiency as did the calcitic liming material used. This may be due to a small content of zinc in the dolomite, approximately 3# per ton.

Mild Deficiency Behavior

Under conditions of mild deficiency, corn tends to grow out of zinc deficiency. It is only where the deficiency is severe that stand and yields are seriously reduced. Only about half the field experiments conducted from 1951 through 1954 showed a significant corn yield response to zinc; yet these experimental areas were chosen because of a supposed zinc deficiency history. In cold, wet seasons, zinc deficiency seems to be more extensive and severe. For this and other reasons, corn in the same field may show deficiency symptoms one year and not the next.

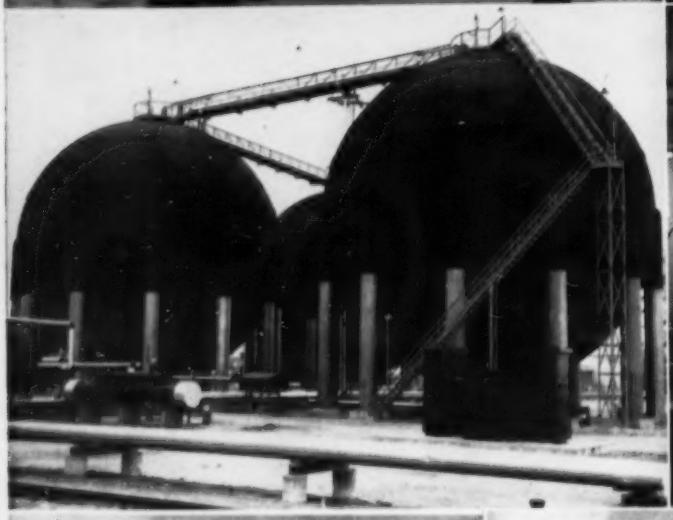
Spontaneous recovery of corn from zinc deficiency may be related to several factors: (1) Availability of zinc may be greater in the subsoil below the limed layer of higher pH. When the corn roots reach the more acid subsoil layer, they may be able to obtain adequate supplies of zinc for normal growth. (2) Root activity and root numbers increase as the corn plant develops, and thus may permit the uptake of greater quantities of zinc from the soil. (3) As the season progresses and the soil becomes warmer, organic matter decay by microorganisms increases, with release of any zinc it contains and with formation of carbonic and other organic acids which may increase availability of soil zinc to plants.

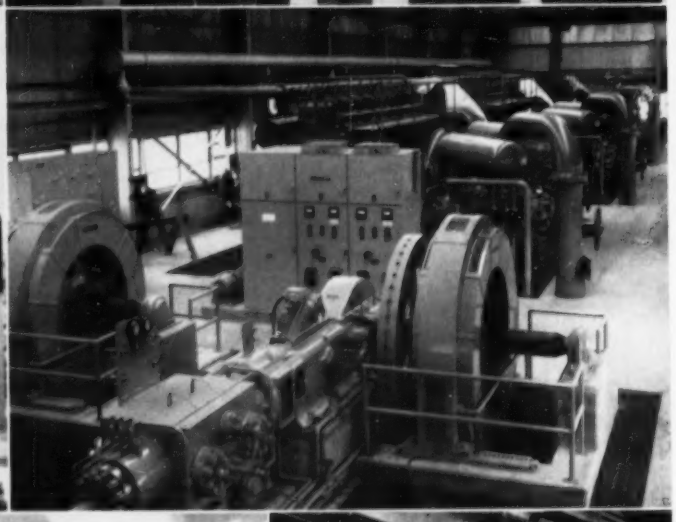
Not Major Problem

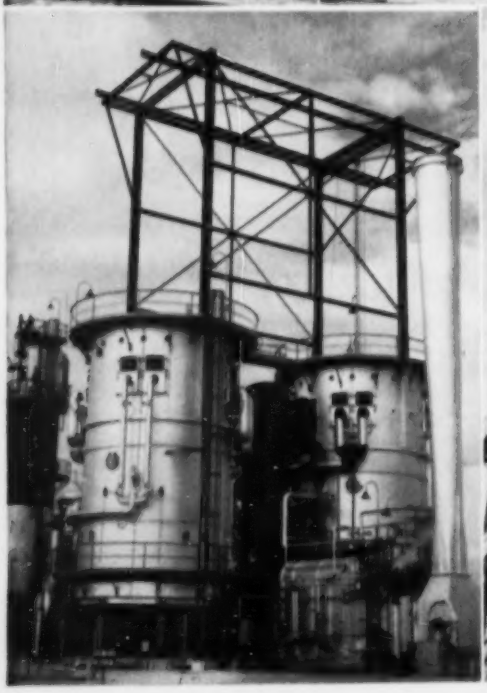
At the present time, zinc deficiency cannot be considered a major problem in Tennessee, and not many

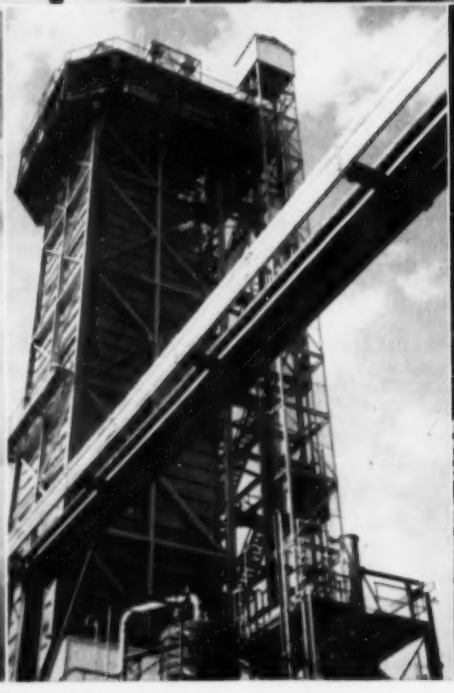
(Continued on page 59)

Escambia Bay Dedication









Escambia Bay Chemical Corporation, formed in 1954 by United Gas, Electric Bond & Share, and the National Research Corporation, on February 17 dedicated their $20,000,000 plant near Pensacola, Fla. in the presence of some 600 visitors. The plant was completed in record time —8 months—by Chemical Construction Corporation.

The 200 daily ton production of the plant, including anhydrous ammonia, nitric acid, ammonium nitrate solutions and ammonium nitrate concentrates is handled by the 44-year-old firm of Ashcraft-Wilkinson of Atlanta, Ga., who maintain offices throughout the 8 state territory to be served by the new plant. In addition, Escambia Bay has employed technical service representatives to assist customers in the proper use of their fertilizer materials.

Shipping facilities are designed so that shipments can go out around the clock, 24 hours a day.

The first chemical plant of its kind in Florida, Escambia Bay incorporates the very latest in chemical plant construction, and our readers should find interesting this description of the operation.

Descriptoin Process

Manufacturing facilities of the Pensacola Plant provide for the production of 200 tons of anhydrous ammonia, 220 tons of 100 per cent nitric acid produced as a 56 per cent water solution, 275 tons of 100 per cent ammonium nitrate produced as an 83 per cent water solution, and 350 tons of pebbled ammonium nitrate daily.

The Pensacola Plant, engineered and constructed after the very latest designs, employs the Nitrogen Engineering Corporation process of Chemical Construction Company based on the Haber-Bosch method. It is the first plant of its kind in the United States to use a potassium carbonated absorption system for the removal of carbon dioxide. The plant's ammonia converter, the largest ever built, is designed to produce sufficient ammonia to give a net production of not less than 200 short tons per 24 hours.

KEY TO PICTURES

1. D. J. Stark, vice-president and plant manager; Jack Criswell, executive vice-president, Anhydrous Ammonia Institute; A. A. Talmage, vice-president, Electric Bond & Share; Kenneth G. Donald, president, Escambia Bay Chemical; N. C. McGowen, board chairman and president, United Gas; Richard S. Morse, president, National Research.
2. Some of the big crowd attending the opening.
3. Three Hortenspheres, each with 2000 ton capacity.
4. Scene in the compressor room.
5. Reformers.
6. Prilling tower.
7. And, finally, the product, bagged and ready to ship.

Ashcraft - Wilkinson's board chairman, George McCarty, and Kenneth G. Donald, president of Escambia Bay Chemical, photographed during the dedication of the big new plant.

Company Personnel

Kenneth G. Donald, president, Escambia Bay Chemical Corp., Cambridge, Mass.; David J. Stark, vice-president and plant manager, Pensacola Plant; Anthony Joseph Bruno, chief engineer; Ralph McCurley Brown, general plant superintendent; John H. Heckert, ammonia plant superintendent; E. M. Spurlock, personnel director; William Raymond Moore, purchasing agent; Durwood Leon Brooks, traffic manager; Everett Leon Stokes, office manager.

Utilities

Cooling towers and pumping facilities are included to cool and circulate 43,000 gallons per minute after suitable decarbonating and treatment. Natural gas for use in the process and for steam generating is purchased from the United Gas Corporation. Steam for the plant is generated by waste heat boilers in the process departments and by gas fired boiler in the Steam Plant. The ammonia making process will require per hour, 190,000 standard cubic feet of natural gas, 47,000 pounds of 200 psi steam and 256,000 standard cubic feet of air.

Gas Reforming Plant

Natural gas passes through organic sulphur removal equipment to remove small amounts of sulphur compounds which may be present. This purified gas is mixed with steam. As a steam-gas mixture it passes through the primary reformer reaction tubes. Hydrocarbons in the gas react with the steam in the presence of primary reformer catalyst to produce H_2 and CO. Some of the CO and steam react to produce CO_2 and additional H_2.

External firing with natural gas in the primary reforming furnaces supplies the heat to support these reactions to the reaction tubes. Flue gasses then pass through a waste heat boiler for heat recovery.

The partially reformed gases go to a secondary reformer where a small amount of residual methane is reformed. Sufficient air is introduced to provide nitrogen for the proper hydrogen-nitrogen mixture for ammonia synthesis. The hot gases leaving the secondary reformers at 1500° F temperature pass through waste heat boiler to cool them to the correct 800° F temperature for the shift reaction (CO Conversion).

The steam-gas mixture passes through the catalyst in the CO Converter to produce additional hydrogen. The converted gas leaving the CO Converter is cooled in a heat exchanger where entering gases are preheated. The converted gas is then further cooled and after one stage of compression is sent to a CO_2 removal system.

CO_2 Removal

The CO_2 is removed from the process gas by scrubbing with an aqueous solution of potassium carbonate. The carbonate solution is then regenerated by heating for continued use. The gases are then further compressed.

CO Removal

At an inter-stage pressure level of 2,000 psi, the gases are scrubbed with a chilled ammonical cuprous acetate solution to remove residual CO and CO_2.

The Compression Plant

This system consists of four multistage gas engine driven compressors with intake pressure of 85 psi, and providing a final stage discharge pressure of 5200 psi. Air for use in the reforming plant also is compressed in this section. The compression stages produce 285, 850, 2,000 and 5,200 psi respectively.

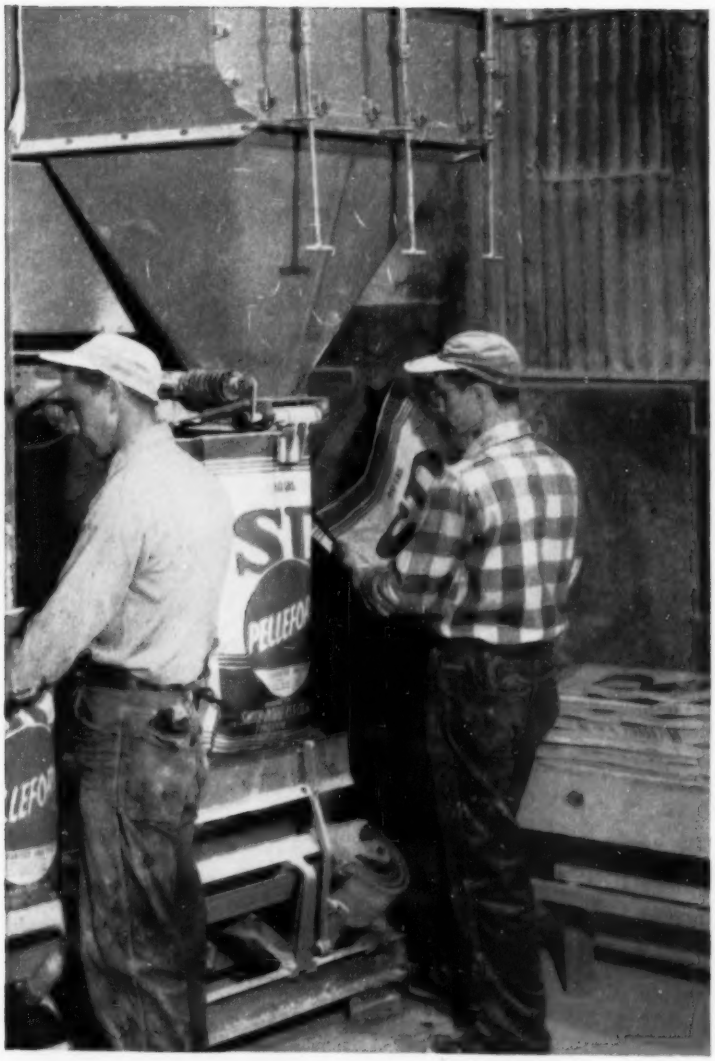
Ammonia Synthesis Plant

The Pensacola plant system produces liquid anhydrous ammonia by the N.E.C. Process. Ammonia is manufactured by the joining of hydrogen an nitrogen molecules to form NH3. The mixture is charged to the synthesis system and mixed with cycle gases at the discharge of the circulating compressors, at which point the greater part of the ammonia has been condensed from the circulating gas.

The total flow is then pre-cooled before admission to the ammonia-cooled secondary condensers where a final condensation of ammonia from the gas takes place. This final condensation of ammonia from the synthesized mixture of make-up and circulating gas is one of the features

(Continued on page 43)

The new Bemis Fertilizer Packer gives you a money-saving combination of speed and accuracy never available before



Smith-Douglass Selects New Packer

This photograph shows the New Bemis Fertilizer Packers in operation in the big Smith-Douglass plant in Streator, Illinois. Smith-Douglass' Plant Superintendent says, "After a thorough test, we find that the Bemis Fertilizer Packer is setting a new record for accuracy. We like it and our men like it."

P. S.—JETROL—a New, Better Way to Add Insecticide to Fertilizer.

Bemis engineers have just perfected and successfully tested JETROL—an attachment for the new Bemis Fertilizer Packer which adds liquid insecticide, in a fixed quantity by volume and by weight, to fertilizer as it is being bagged. JETROL is accurate, consistent, and minimizes toxic problems. The cost? You'll be agreeably surprised.

The fertilizer you save through accurate weights and the labor you save through speed and a smaller crew will soon pay for your new Bemis Fertilizer Packer.

In actual plant operation the Bemis Packer is filling and closing sixteen to eighteen 80-lb. bags per minute . . . and holding to a weight tolerance of plus or minus 4-oz.

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Other features . . .

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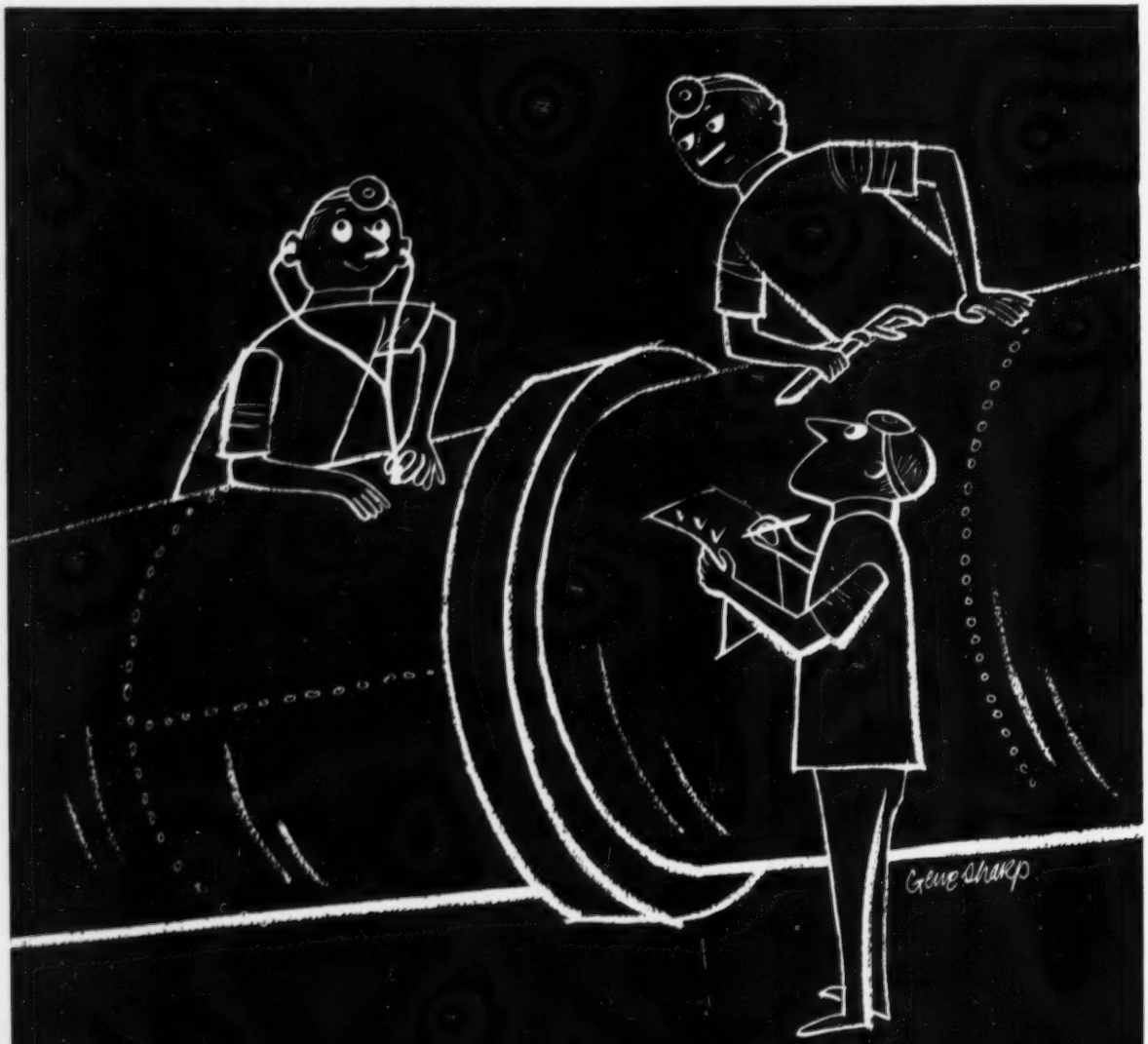

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General Offices: 135 South La Salle Street • Chicago 90, Illinois

Escambia

(Continued from page 39)

of the N.E.C. process in that the condensing ammonia stream tends to remove any impurities which might poison the synthesis catalyst.

Leaving the converter, the gases are cooled in the water cooled primary condensers where the greater part of the ammonia content is condensed and removed at the primary separators as liquid anhydrous ammonia. The uncondensed gases pass to the circulators for recirculation.

Nitric Acid Plant

Nitric acid is manufactured by burning ammonia with air and absorbing the resulting oxides of nitrogen in water under pressure. Liquid anhydrous ammonia is vaporized and mixed with hot compressed filtered air. The ammonia-air mixture flows to an ammonia burner where in the presence of a platinum base catalyst the ammonia reacts with the oxygen in the air to produce nitrous oxide (NO) and water.

The burner products consisting of nitrous oxide, nitrogen, oxygen and water vapor which are at the temperature of 1715° F, are partially cooled in a waste heat boiler and through a train of heat exchangers. Some water vapor is condensed from the gases as weak nitric acid in the final stages of cooling. This weak acid is pumped to the appropriate tray in the absorption tower. The cooled gases are introduced to the bottom of the absorption tower. Compressed air is also charged into the bottom of the tower to oxidize the (NO) in the burner gases to (NO_2). The NO_2 is rapidly absorbed by the water and reacts with it to form nitric acid (HNO_3) and nitrous oxide (NO). The nitrous oxide so formed reacts with oxygen and water to produce more nitric acid. Make-up water for acid production is added to the top of the absorption tower. The spent gases are released to atmosphere through a pressure control valve and a power recovery system.

Acid flowing from the bottom absorption tray is bleached with secondary air, and the 56 per cent water-white nitric acid flows to acid storage tanks at the nitrate plant.

Ammonium Nitrate Department

Liquid ammonia from the storage tanks is vaporized and mixed with the 56 per cent nitric acid in a neutralizer to produce an ammonium nitrate solution of about 83 per cent concentration.

This solution is continually withdrawn to the process solution storage tank. From there it may be sent to either ammoniated solutions production storage, or to the prilling plant.

Ammonium Nitrate Solutions

Ammoniated solutions are made by mixing correct amounts of ammonium nitrate solution and ammonia plus small quantities of corrosion inhibitors.

From the solutions mixing tank it is pumped into tank cars for shipment to customers under the trade name—Baysol.

Ammonium Nitrate Concentrates

From the ammonium nitrate solution tank the 83 per cent mixture passes into a concentrator. The concentration from 83 per cent to 95 per cent solution which is essential for pebbling is achieved by boiling the solution at about 280° F under a partial vacuum.

The solution leaves the concentrator by means of a high level overflow and is pumped to the constant head tank at the top of the prilling tower after passing through a steam heater to ensure a proper operating temperature of 280° F. From the head tank it flows to a system of spray headers that distribute it across the entire cross section of the tower.

As the drops of solution fall through the tower they are met by a large volume of air being pulled upward through a series of fans. The relatively cold air chills the drops to form "pebbles" about the size of bird shot. The pebbles are collected at the bottom of the tower on a conveyor belt and are transported to the drying system.

The drying system consists of a pre-dryer, dryer, and cooler.

The dried pebbles go to a tumbler mixer where diatomaceous earth is added as a coating to prevent absorption of moisture upon storage. The coated ammonium nitrate concentrate is then screened, bagged, weighed and conveyed to storage or for shipment under the trade name Ammo-Nite.

The drying, coating, and bagging operations are carried out in a controlled humidity atmosphere.

Plant Personnel

Months of research and planning by trained personnel were made befor the three companies involved were brought together to organize the present corporation.

Men from 22 different companies, averaging 12 years of experience, earned in associated duties, form the core of supervisors. The average age of these men is 35. They include graduates from 25 different colleges and hail from 14 states and three Canadian provinces.

The plant is semi-automatic in its operation, therefore, the personnel requirements to operate the plant are small in numbers but possess a high degree of intelligence and experience. To accomplish this, the management of the Pensacola plant attracted personnel from 19 states, of which one-third are native Floridians. All of the personnel recruited from outside the local community were persons possessing years of experience in the successful operation of similar plants.

Dedication Ceremonies

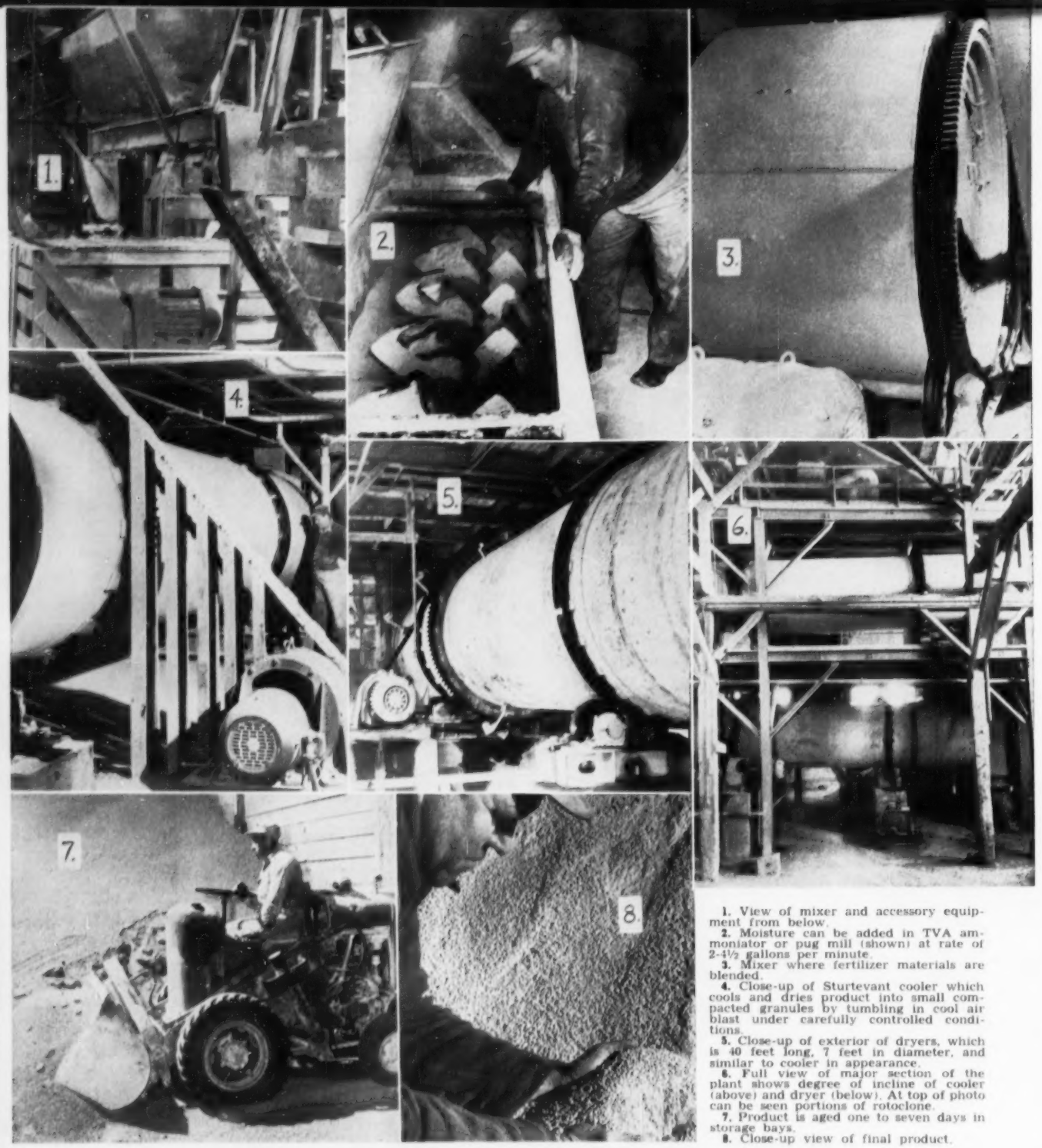
On hand for the dedication ceremonies at the plant were ranking officials of the company, agricultural and chemical industry leaders from throughout the nation, and an imposing list of magazine and newspaper representatives.

Present to officially dedicate the state's first plant of its kind were Senator George A. Smathers and Congressman Robert A. Sikes. Governor Leroy Collins was represented by A. Clifton Johnson of Pensacola.

Kenneth G. Donald, Cambridge, Massachusetts, president of the newly formed corporation, gave the signal to unfurl the Escambia Bay green flag officially launching the company's first plant which actually has been in operation since December 28, 1955.

David J. Stark, vice-president and plant manager of the Pensacola Plant, in telling the story of the organization of Escambia Bay, called attention to the fact that the new facility is employing approximately 200 persons and provides the area with an annual payroll of approximately $1,000,000 exclusive of local expenditures for materials and services.

The corporation made a comprehensive study of markets and supply before launching into the fertilizer manufacturing field. They found that the Southeastern section of the United States consumed more nitrogen fertilizers than any other area of the nation.



1. View of mixer and accessory equipment from below.
2. Moisture can be added in TVA ammoniator or pug mill (shown) at rate of 2-4½ gallons per minute.
3. Mixer where fertilizer materials are blended.
4. Close-up of Sturtevant cooler which cools and dries product into small compacted granules by tumbling in cool air blast under carefully controlled conditions.
5. Close-up of exterior of dryers, which is 40 feet long, 7 feet in diameter, and similar to cooler in appearance.
6. Full view of major section of the plant shows degree of incline of cooler (above) and dryer (below). At top of photo can be seen portions of rotoclone.
7. Product is aged one to seven days in storage bays.
8. Close-up view of final product.

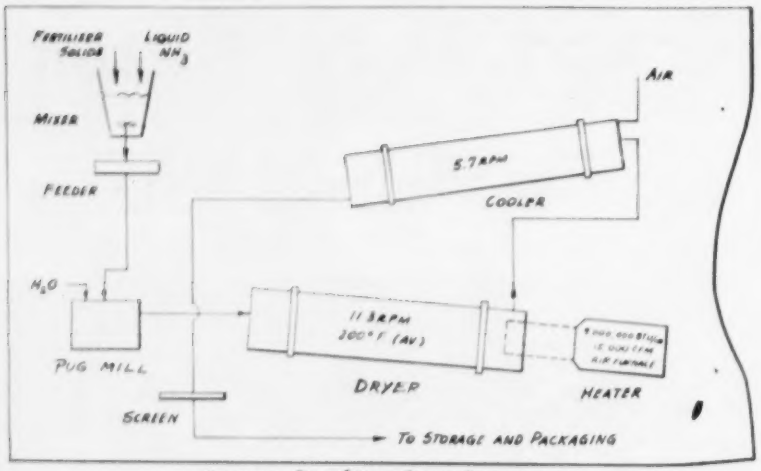
CANADA PACKERS CONVERT TO GRANULATION

Throughout sections of the United States and Canada, the strong trend toward the replacement of powdered fertilizer with the granular product is continuing at a rapid pace. A case in point is the installation of Canada Packers, Limited, in St. John, New Brunswick. This plant, designed and engineered by Sturtevant Mill Co., of Boston, is one of the most recent granular mixing plants in Canada changed over to granulation using a complete Sturtevant Package Unit. Fourteen months ago, the plant was adapted to turn out granular fertilizer in addition to the conventional mixed powdered product.

Granular Fertilizer A Success

As evidence of the success of this granular product, Canada Packers expects this year to ship about 70% of its total production in this form. Moreover, the company expects this figure to increase to 100% in a very short time.

The granular product needs little or no aging and can therefore be bagged more conveniently. Similarly, it is less likely to cake either in stock piles or bags. The manufacturer also can spread his produc-



SCHEMATIC FLOW CHART-CANADA PACKERS CO., LTD.
GRANULAR FERTILIZER MIXING PLANT

tion out evenly and economically instead of running 24-hours a day, several months a year.

However, just as the product in this case is newsworthy, so too is the engineering and equipment that make it possible, especially since this plant was something of a pioneering venture for this Canadian firm.

HOW PROCESS WORKS

Mixing

The process begins with blending of the solid fertilizer materials with liquid ammonia in a mixer. Next, moisture is added at a rate of 2-4½ gal. per minute, depending on the materials being blended. The Sturtevant design permits this to be done either in a TVA ammoniator or a pug mill.

Drying

From this point, the material is fed into the granulator section of the dryer at a rate of 13-17½ tons per hour. The slightly inclined combination granulator and dryer is 40 ft. long and has an outer diameter of 7 ft. It is rotated at 11.3 r.p.m. by a 30-hp gear motor drive. The materials enter the granulator section at the cool end of the dryer. From the other end a 15,000 cfm air furnace capable of developing 9,000,000 btu/hr. supplies the necessary hot air. The product is tumbled by means of specially-designed flights inside the dryer. The action of heat and tumbling under the carefully-controlled conditions causes the formation of small, homogenized granules. Average temperature within the unit is maintained at about 200° F.; no pressure is developed. Average residence time in the unit is approximately 7-8 minutes.

Cooling, Pelletizing

From the dryer the material is conveyed into a cooler 40 ft. long, 6 ft. in diameter and very similar in appearance to the dryer. The cooler is fed with the granular product at about 200° (approx. 2% moisture) and by means of specially-designed flights and controlled cooling air, the product becomes a cooled, dry, well-formed hard-pelletted material. The complete cycle through dryer and cooler takes about 20 minutes, thus the dryer and cooler hold about 4 tons of material at any given processing time. Controlled air velocities remove the dust at both the dryer and the cooler, sending it to a cyclone where the dust is separated and carried back into the conveyor system, from which it is recirculated through the processing operations. Similarly, air from the cyclone passes through a rotoclone for final cleaning.

Screening

From the cooler, the product is classified on a double-deck screen. Since the screening operation is new, little data are available. However, it is estimated that 60-70% of the product passes through the 5-mesh screen. The over-size is recycled to the screen after passing through a rotary pulverizer. The lower 30-mesh screen holds the on-size particles and passes the fines which are returned to the processing operation.

Bagging

After classification, the finished product goes directly to storage bays where it is aged for a period varying from one day to about a week. After this, it is bagged and shipped under the company's trade name, Shur-Gain Fertilizer. The granulation operation requires a crew of six men who attend to all operations including the assembling of material, mixing, granulation and distributing to storage. This is one man less than was required with conventional powdered fertilizer. The St. John plant supplies the Canadian province of New Brunswick as well as northern Maine.

Altogether, it seems that the pioneering effort of Canada Packers, Limited, into granular fertilizer has been an unqualified success. The equipment has proved satisfactory and the chief problem anticipated by the company is keeping up with demand for the product.

Four Fertilizer Firms Get Management Award

Four companies prominent in the fertilizer field have been certified as Excellently Managed by the American Institute of Management. Those named are: American Agricultural Chemical Co., Swift & Co., Borden Co. and Consolidated Mining and Smeltering Co. of Canada. This places them among the 408 American and Canadian firms so cited by the Institute for 1955. Consolidated Mining and Smelting Co. of Canada is receiving the award for the sixth consecutive year. American Agricultural Chemical Co., Swift & Co. and Borden Co. are receiving the award for the fifth consecutive year.

Small Farms Said Caught In Pincer

Operators of small farm units are particularly hard hit by the so-called cost-price squeeze, says the California Fertilizer Association.

It points out that there are two ways to increase crop volume. One is to acquire more land, and the other is to build up the productive capacity of the land now being farmed.

The Association reports that farm research authorities have found that many California and Arizona farms are producing only about half their productive capacity. Building up the land's crop producing abilities will increase farmer net income considerably more than buying or renting additional land.

Higher soil fertility reduces costs of crop production by providing more crop units per man employed, more units per machine or implement in use, and more units per acre.

High Speed Reduction to Micron Sizes — No Attritional Heat!

ENGINEERING FLUID-JET GRINDING IN "PACKAGE UNITS"

. . . comes naturally to Sturtevant engineers — with their 75-year tradition of successful solving of dry-processing problems. If you want to accomplish the most effective grouping of a Micronizer* Grinding Machine with necessary compressor, feeder and dust-collector, it will pay you to investigate. Check the coupon on the right for more information.

Sturtevant Micronizer* Grinding Machines Give Greater Finenesses than Tube or Roller Mills

Look at the record! 30 inch model reduced titanium dioxide to 1 micron and finer at solid feed rate of 2250 lbs. per hr. 24 inch model reduced DDT (50%) to 3.5 average microns — 1200-1400 lbs. per hr. 8 inch model reduced Procaine—Penicillin—to 5 to 20 microns—up to 20 lbs. per hr. Couldn't you use milling performances like these?

No moving parts. The particles grind each other. High-speed rotation and violent grinding impact of particles are caused by jets of compressed air or steam at angles to the periphery of the shallow grinding chamber. There are no problems of attritional heat. Centrifugal force keeps over-sized particles in the grinding zone. Cyclone action in the central section classifies and collects the fines for bagging.

Instant accessibility, easy cleaning. Micronizer* Grinding Machines come in seven sizes — each one constructed for quick accessibility and easy maintenance (typified by the "OPEN DOOR" design in other Sturtevant equipment). Grinding chambers range from the 2 in. laboratory size with ½ lb. per hr. capacity to the 30 in. size which handles up to 3000 lbs. per hr.

* Registered trademark of Sturtevant Mill Co.

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Dry Processing Equipment

The "OPEN DOOR" to *lower* operating costs over *more* years

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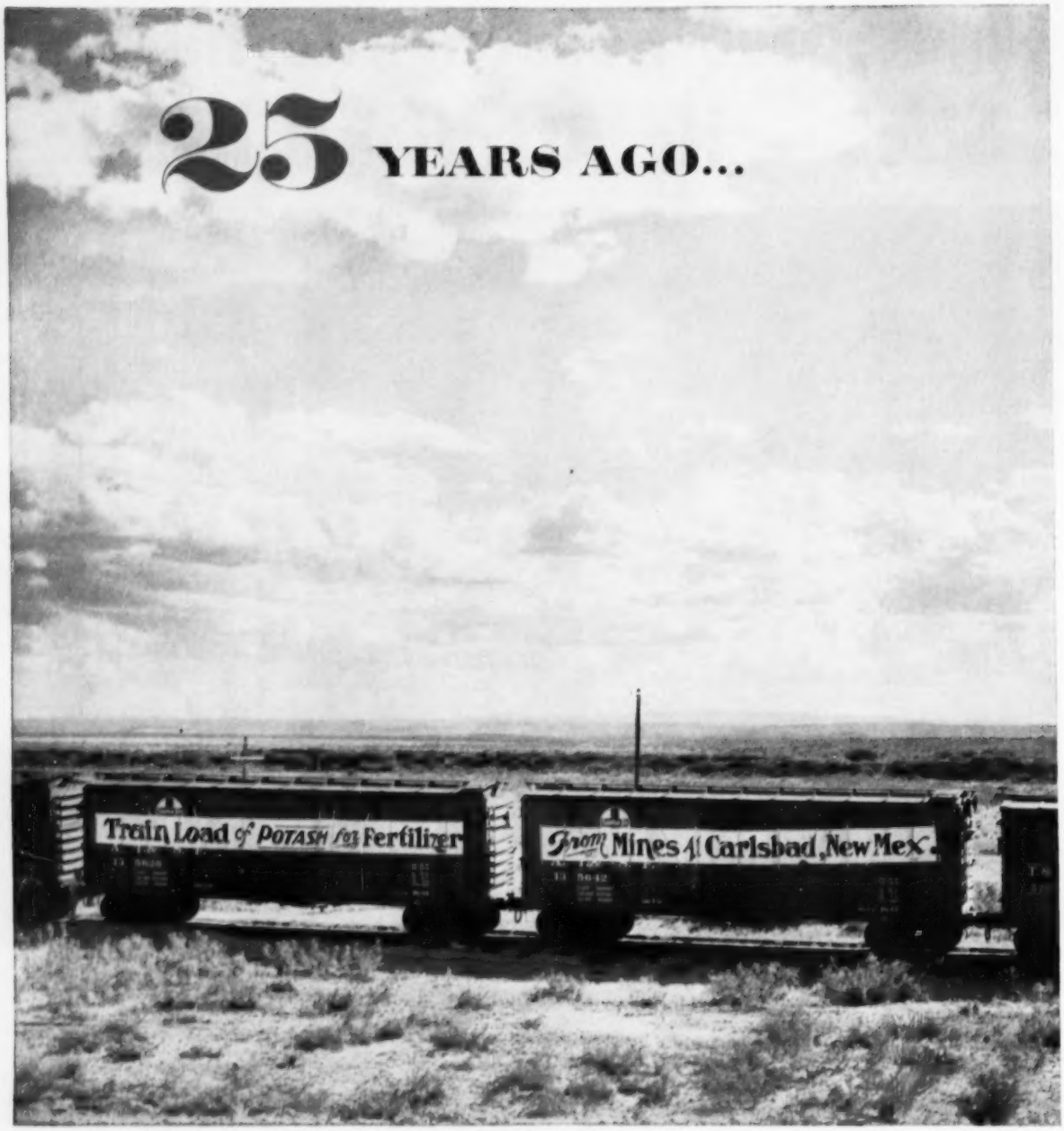

EARLY IN 1931, to the cheers of townspeople, the United States Potash Company sent the first carloads of potash from Carlsbad, N. M., the then young center of the potash industry in the U. S.

It was an event of importance not only to the prosperity of New Mexico, but to the entire nation as well. Potash, as a vital component of the millions of tons of fertilizer used annually in agriculture and as a basic raw material for the chemical industry, has helped to build a richer America.

The Carlsbad area of New Mexico now produces almost 90% of the potash used in the nation. USP, which continues to build and expand with modern equipment and production methods, is proud to have been the pioneer developer of the great mineral resources of this area.

HIGRADE MURIATE OF POTASH 62/63% K_2O
GRANULAR MURIATE OF POTASH 60% K_2O MIN.

REG. U. S. PAT. OFF.

UNITED STATES POTASH COMPANY
INCORPORATED
30 Rockefeller Plaza, New York 20, N. Y.
Southern Sales Office
Rhodes-Haverty Building, Atlanta, Georgia

ARIZONA

Kennecott Copper is about to build at Hayden, via **Chemical Construction Co.**, a sulphuric plant of 100 daily ton capacity, using gas from their copper roasting.

ARKANSAS

National Farmers Union's multi-million plant is still the source of competition between communities. As we have reported previously, Helena was pretty confident about the whole thing, but lately they are not so sure because an offer has come through from Calion (near El Dorado) showing economies in freight, labor and a local supply of nitrogen. Our first item on this subject indicated that the site might be in Georgiana, Alabama.

National Farmers Union officials were to look over the Calion site late last month, but we have no word as we go to press except that construction is not now slated until 1957.

CALIFORNIA

Stauffer Chemical has made the first shipment of pelletized mixed fertilizer frot heir new $1,000,000 plant at Vernon, the first of several like it which Stauffer will build in the West. Initial shipments were 17-7-0. Plans are to produce also 5-15-0, 10-10-5, 10-10-10 and special mixtures as well as pelleted single superphosphate. **Wilson & Geo. Meyer & Co.** are, as we have reported, exclusive selling agents.

* * *

American Potash & Chemical's new plant at Vernon will be in production in a matter of months now. **American Potash** and **California Spray Chemical** between them are expected to consume the technical parthion to be made there.

* * *

California Spray-Chemical have awarded contract to **Barrett Construction** to build a new bulk storage warehouse at their main plant in Richmond, as part of their new $16,000,000 fertilizer operation.

FLORIDA

Davison executives recently visited Polk to inspect the new phosphate operations there. President **M. G. Geiger; A. T. Daignault, W. R. Grace** executive vice-president and **W. E. McGuirk, F. C. Nicholson** and **H. S. Ferguson,** Grace chemical group executive vice-president; and **C. E. Waring,** Davison vice-presidents; **J. L. Dowell,** director of budgets, were entertained by **John M. "Red" Harris,** manager of the Florida phosphate division.

Swift & Co. are to build a plant food works at Pompano Beach, which manager **Jay W. Whitaker** hopes to have in operation by Fall. **S. S. Jacobs Co.,** Jacksonville, are the contractors.

* * *

International Minerals & Chemical have stepped up the operating schedule of the Achan mine to 24 hours a day.

IM&C recently staged a dinner for Polk countians during which president **Louis Ware** told them about the $4,000,000 expansion program which was reported here last month.

Na-Churs Plant Food Inc. is in production with the plant at Winter Garden which we reported here in November. They announce that their product will not take business away from fertilizer mixers, but will "supplement what's already being used." The concern is 10 years old, and last year reportedly grossed $1,500,000 at their Marion, Ohio operation. They also have a plant in London, Ontario, Canada. The Winter Garden plant includes $100,000 of equipment, according to board chairman Ben Peterson.

* * *

Tampa Terminal, Inc., subsidiary of **Tampa Marine** will build a new phosphate elevator at the head of Ybor Channel, Tampa, and expect to have it in operation by June 1, according to **Ned Moran,** general manager of **Florida Stevedoring, Inc.,** another Tampa Marine subsidiary.

Phosphate Area Roundtable are sponsors of a new athletic field and phys-ed area for the Mulberry High School. **Marion H. Wiggs** is Roundtable chairman. With him on the committee are **John Handley, Harvey Prevatt, Floyd Lowery** and **Dick Hawkins.** Company equipment was loaned for the project by **International Minerals & Chemical, Davison Chemical, American Agriculture Corp.** and **American Cyanamid.** Members of the **AFL Chemical Workers Union** donated their time to operate the equipment.

* * *

Armour Fertilizer's Bartow works had some excitement the other day when a string of 20 phosphate cars decided to fare for themselves, and rolled into Bartow where an automatic derailing device halted their mad career. They crossed seven streets on the trip . . . and nobody was hurt. Nor was harm done except that the derailer pitched five cars off the tracks. Railroad men are still scratching their heads over the happening.

GEORGIA

Stephenson Chemical Co., College Park, has been organized by **C. P. Stephenson,** chemist, to produce dry agricultural insecticides in an existing building, 50 by 100 feet.

IDAHO

Anaconda's fertilizer department has announced the closing of their underground mine at Conda. According to superintendent **L. E. Traeger,** the mine, which was opened in 1920 and has been producing some 10,000 monthly tons, has run into unduly high production costs. The shutdown is "indeterminate" and personnel will be absorbed in other Anaconda activities. Strip mining will be continued, and may be expanded.

ILLINOIS

Steve Turner, Pontiac, is now publishing a house organ called "Steve Turner Farm News" in the first issue of which he announces he has become exclusive distributor in the Pontiac area for "Big N", the **MidSouth Chemical** anhydrous.

A NEW AND RELIABLE SOURCE OF NITROGEN FERTILIZER . . .

for Fertilizer Manufacturers

The $16,000,000 plant of the Mississippi River Chemical Company at Selma, Mo. – now in production – guarantees the fertilizer manufacturer top quality in AMMONIUM NITRATE 33.5% N, AMMONIUM NITRATE SOLUTIONS and ANHYDROUS AMMONIA. There is the further assurance of dependable service developed from Bradley & Baker's many years of experience in meeting the plant food requirements of manufacturers throughout the country.

STEAMBOAT BRAND
AMMONIUM NITRATE
33.5% N

STEAMBOAT BRAND
AMMONIUM NITRATE
SOLUTIONS

STEAMBOAT BRAND
ANHYDROUS
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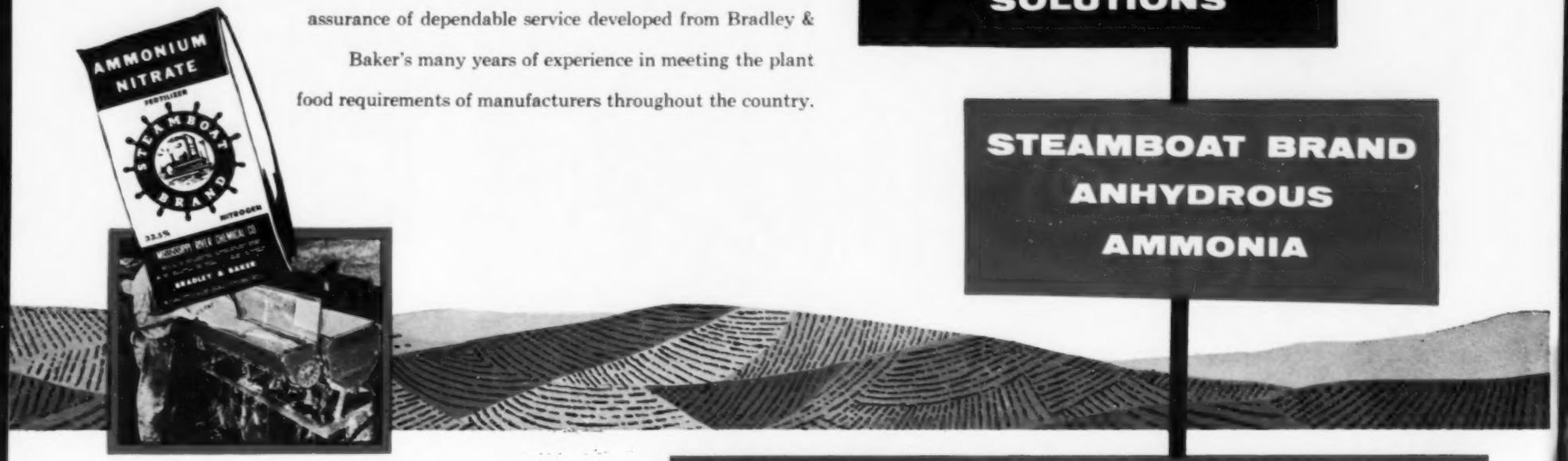

MISSISSIPPI RIVER CHEMICAL COMPANY
A Division of Mississippi River Fuel Corp., St. Louis, Mo.

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He promises columns by **Dr. Jerry Lyons,** their agronomist, to be called "Off the Cob"; one by Jack Turner, "who is responsible to see that things get done around here" to be called "On the Line"—and some others, including one for the ladies.

In the second issue the famous Pacemakers are reported organizing for 1956. We have reported on that group in these columns. They are a group whose whole objective is to learn more about raising corn and other crops at a profit. The issue also announces that the Turner agronomists have been picked to do the MidSouth soil testing for Illinois and Indiana.

* * *

Myers, Inc. have established in Lexington a bulk fertilizer plant, dealing in bulk, bagged and liquid fertilizers and custom application. The concern is headed by **Ollie Myers,** former vocational agriculture instructor in the local high school.

INDIANA

Umbaugh Agricultural Chemical Co., Memphis, Tenn., are under way with a $300,000 plant at Jasonville, which **Ray Umbaugh,** president, hopes will be in operation by the first of next month. **Richard Meisenheimer** is regional manager.

IOWA

Continental Fertilizer Co., have announced that their new concentrated liquid fertilizer "Shur-Green" will be available to most mid-West areas this spring. President **Oliver Haley** tells us that the product, which has been tested for two years is applied as turf or soil is watered, through a "gro-gun" which will handle an average lawn in 15 minutes. Analyses will vary for various areas, and free soil tests are promised within 48 hours after samples reach the factory at Nevada.

* * *

Good Land Agricultural Chemical Co. middle of last month was about ready to launch construction of their new liquid fertilizer plant in West Union, Plant equipment is being made now by **Fabricated Metals Inc.,** Leandro, Cal. and a 40 by 60 foot, single story, pole-type building is to be erected by **Carpenter and Kraft Construction Co.** The bulk of the equipment—an ammonia convertor and a reactor unit will not be under cover. The plant will produce 15 hourly tons, converting anhydrous ammonia to a 20% N solution.

FEDERAL DENIES PLANT PLANS

Last month we stated that Federal Chemical was planning to build a $2,000,000 plant at Rockford, Ill. basing the story on information from a source heretofore found reliable. But Executive Vice-President J. D. Stewart writes: "We have no plans whatsoever for a fertilizer plant in Rockford, much less a two million dollar one."

KENTUCKY

Cardinal Chemical Co. has been established at Cynthiana by **Lorena J. Deming** and **Gene Van Deren** to manufacture and deal in fertilizers and crop chemicals.

LOUISIANA

Commercial Solvents are planning a new nitric unit a Sterlington, which is expected to run to 150 daily tons capacity.

* * *

Petroleum Chemicals, joint subsidiary of Continental Oil and Cities Service, are getting ready to announce their Lake Charles project, an ammonia plant expected to be rated at 300 daily tons.

* * *

Ouachita Fertilizer and Chemical, Monroe, is in business with their 100% water soluble 8-8-8, 10-10-10 and 3-11-11 for local use and an 8-24-0 for Texas areas. Nelson D. Abell is owner; Clarke Williams, manager; A. V. Frost production superintendent .

Plantation Fertilizers Corp. and/or **Plantation's Chemicals, Inc.** became known, effective February 20, as **Flo-Mix Fertilizers Corporation,** we learn from **Theo L. Holsapple,** who writes there will be no immediate change in the operating personnel.

MAINE

Northern Chemical Industries, Searsport, has published a report from president **J. E. Totman,** with photographs of the new units being built by **Girdler Co.** and **Leonard Construction Co.** which have been discussed previously in these columns. Especially interesting is a color picture of the NCI tank car fleet, all dressed up in the red, white and blue State of Maine color scheme.

As our readers know, NCI is affiliated with **Summers Fertilizer,** Baltimore, of which Mr. Summers is also president. Summers has at its nine plants captive requirements for a substantial part of NCI's N production, which will be the only N producing point in the Northeast, and the first in North America to turn out anhydrous exclusively from Bunker "C" oil under the Texas Oil-Hydrocarbon Research Process.

MARYLAND

Wm. B. Tilghman Company, Salisbury, as our readers know, publish "The Tiller", an excellent little house organ. What brings it especially into these colums this month is the January issue, which brings to its farmer readers in a number of ways the value of the **Del-Mar-Va Peninsular Fertilizer Association.** It quotes, for example, from U of Md's **Dr. Paul E. Nystrom:** "A fertilizer salesman should inform as well as sell." They go into this pretty thoroughly—and it seems a very fine compliment to their own staff because that quote puts the monkey squarely in any Tilghman salesman to know his stuff.

They also tell how the Del-Mar-Va group plans to do a soil improvement project, which includes the contribution of fertilizers for test plots.

Many more items, all constructive—proving there's no need for a fertilizer house organ to yell at the top of its lungs about the virtues of company or project—if it will just quietly develop the confidence of the farmer by deserving that confidence with useful and usable information.

MISSOURI

Spencer Chemical were recent Kansas City hosts to 23 boys from eight states—the top participants in Spencers Efficient Corn Growing Program, in which more than 900 boys "learned by doing." The party included a trip through the Spencer Jayhawk Works.

MFA formally opened their bulk plant at Jeffriesburg the middle of last month, with refreshments for all. Manager **Oliver Barnard** and assistant **Ed Brinker,** played host to the visiting farmers. This plant is one of eleven now in production for MFA in Missouri.

NEBRASKA

Nitrogen Division, Allied Chemical & Dye Corporation, have announced that it will place in operation at its Omaha, Nebraska plant new facilities for the production of additional nitrogen fertilizer solutions this month. Construction has been underway for several months and will be completed in time to supply the heavy spring demand.

The new installations will produce solutions of the ammonium nitrate and urea type, marketed under the trade names Nitrana, Urana and Uran. At the present time the Omaha plant produces ammonia, urea-ammonia solutions, and solid urea products.

This expansion at Omaha will place Nitrogen Division in a position to expand its service to customers in Nebraska, Iowa and neighboring states.

Agrifirst Chemical, Lincoln, has moved from the quarters it has occupied since it was established in 1946 to a new 70 by 140 feet which will house both offices and warehouse. Headed by **Carroll Girardot,** the concern handles crop chemicals, spray equipment and fertilizer spreaders.

* * *

Gro-More Fertilizer & Chemical, McCook, are using a series of small newspaper ads—"readers" the newspaper trade calls them—of which this is a sample:

"NOTICE TO FARMERS: If you have the water, you can produce 100 bushels and better corn every year by following the book. Farmers will be at the meeting who have done it year after year. You are invited to attend the Gro-Mo Fertilizer Chili Feed to be held Wednesday, 6 p.m. at the Clubertson V.F.W. Club."

NEW YORK

Air Reduction, New York, is about to spend $16,000,000 to increase its liquid and gaseous production at the present Butler, Pa. and Riverton, N. J. plants and in new plants at Chicago and Alton, Ill., and Calvert City, Ky.

* * *

Arabian American Fertilizer Corp., New York, has been incorporated listing 300 no par shares. Directors: **Harold W. Conroy, Ezra P. Prentice, Jr.** and **Edward W. Franklin,** all of 14 Wall Street.

* * *

Needham Associates, One East 35th St., NYC, have been incorporated listing $20,000 of capital stock. Directors: **Basil A. Needham, Marian Jones, Eugene M. Zack.**

OHIO

Norman Godden and **Don Humphrey** are building a $50,000 liquid fertilizer plant at Kingston.

OREGON

Chipman Chemical are building a crop chemical plant at Portland, which will be the first of its kind in the Pacific Northwest. Due to be in production this Spring, it will have a capacity of 5,000 annual tons of 2,4-D and 2,4,5,-T. The plant will cost in the vicinity of $1,000,000.

SOUTH CAROLINA

Carolina Spreading Company has been set up in Newberry to handle lime, fertilizer and equipment. Capital stock $16,000. President, **Emerson E. Westbrook.**

* * *

Dixie Chemical Co., Greenwood, has been chartered to handle livestock and to manufacture fertilizers and animal by-products. Capital stock, $20,000. President, **P. H. Barnette.**

TENNESSEE

Mid-South Chemical will distribute enough agricultural nitrogen this crop season to fertilize 10,000,000 acres, according to statements made by top officials of the two oil companies which have an interest in Mid-South: **Continental Oil Co.** and **Cities Service Co.** board. Present for the meeting were **B. M. Watson,** president of Cities Service; **H. G. Osborn,** vice president of Continental Oil in charge of manufacturing; **Harry Kennedy,** vice-president of Continental in charge of marketing; **Charles Perlitz,** senior vice president of Continental; A. P. Frame, vice president and a director of Cities Service, and **F. M. Simpson** of New York, president of **Petroleum Chemicals Inc.**

Ellis T. Woolfolk, president of Mid-South, and **J. D. Wooten,** vice president, reported on progress of Mid-South's expansion program, begun last July.

Since that time a 550,000 gallon anhydrous ammonia terminal has been built and placed in operation at Harlingen, Texas, and a network of distributing stations established in Texas, Louisiana, Illinois and Iowa. These distribution points are in addition to more than 60 stations already in operation in Tennessee, Kentucky, Missouri, Arkansas, Mississippi and Alabama.

SACKETT "TUNED TO THE TREND" ENGINEERING SPEEDS PRODUCTION OF

Granular MIXED GOODS

Whether you are planning to build a new plant for the production of granular mixed fertilizers or to convert your existing facilities for granular production, Sackett has exactly what you need in the way of know-how, process equipment and expert engineering and field management.

We are presently building Continuous Granulating Processes in 10, 15, 20, 30 and 40 ton per hour sizes. These capacities are based on a classified finished product.

We invite you to call us in for a consultation.

Superphosphate and mixed goods producers are invited to get our seasoned counsel on their expansion and modernization programs. It is available at no cost.

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America's Foremost Designers and Builders..

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THE A. J. SACKETT & SONS CO.,
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Architects and Manufacturing Engineers

Current expansion plans include increasing the capacity of the Memphis river-rail-highway terminal on President's Island, a project now in progress, and the building of additional terminals at other strategic points along the Mississippi River.

Mr. Woolfolk predicts the company will distribute 50,000 tons of Big N nitrogen fertilizer this season.

TEXAS

American Farm Chemicals, has purchased property in Bellville, and was expected to be in production middle of last month on liquid fertilizers and crop chemicals. **Max W. Sieh,** president; **Carlton Kinnison,** secretary-treasurer.

* * *

Shea Chemical expect to be in production by October at their new $1,500,000 sodium phosphate and phosphoric acid plant at Miller Switch. Expected capacity 60,000 annual tons.

VIRGINIA

Nitrogen Division announces that it will install, at its Hopewell plant, facilities for the production of solid ammonium nitrate 33½% N. The new facilities are expected to be in run about the end of 1956.

Products for agriculture now manufactured at Hopewell include synthetic ammonia, ammonium nitrate solutions, urea solutions, nitrate of soda, sulfate of ammonia and ammonium nitrate-limestone.

WISCONSIN

Northwest Cooperative Mills, Green Bay, early last month began test runs of their $200,000 addition which will granulate fertilizer by the **Stedman-Snyder** process.

AUSTRALIA

Broken Hill Associated Smelters has completed succesful tests of their 50,000 annual ton sulphuric acid plant at Port Pirie. This by-product acid plant is the first of its kind in Australia.

BRAZIL

Industrias Quimicas Reunidas Bek, S. A., San Paulo, has been formed to expand the work of the old company, **Productos Beko Ltda.** and need $411,000 of American capital to build a factory and equip it. Plans are for production of disinfectants and related products in addition to crop chemicals, paints, cleaning fluids etc.

CANADA

Electric Reduction Sales expect to be in production by early next year in their Hamilton, Ontario facilities. These will produce phosphates from electric furnace phosphorus, and by wet-process phosphoric acid.

Shawinigan Chemicals Ltd. will construct a sulphuric acid unit at Shawinigan Falls, Quebec. The construction contract has been awarded to **Chemical Construction Corp.** The unit is slated to turn out 75 daily tons.

FINLAND

Typpi O/Y will build a new fertilizer plant in Ohalu, using German Kola phosphate rock and potassium chloride, which will be in operation by June of next year. Contract has been signed between Typpi and **Potasse & Engrais Chimiques** of France. The plant which is almost on the Arctic Circle is scheduled to produce 400 daily tons, via PEC's carbonitric process.

MEXICO

Pan American Sulphur is about ready to begin on its $1,500,000 expansion which will increase capacity 50% from its Jaltipan Dome in Vera Cruz, according to president **Harry Webb.** The contract has been awarded to the Mexican subsidiary of **Brown & Root, Inc.** Houston, Texas, and completion is scheduled for September. The Pan American dome is said to have known reserves of 35,000,000 tons and only 25% of the dome has been explored.

NORWAY

McKox Industri is doing well with its Jiffy-Pot, reported here some months ago. Sold exclusively through **Geo. J. Ball,** West Chicago, Ill., the Jiffy Pots should run to 30,000,000 pots sold in the U.S. this year, and the plant in Oslo is being expanded to 100,000,000 annual pots, according to partners **Odd Melvold** and **Lief Knoxvold.**

Jiffy Pots are molded plant growing containers, 75% peat and 25% wood fibre with added soluble fertilizer. Roots grow through the walls and the repotting or removal to beds is accomplished without removing the pot.

SOUTH AFRICA

African Explosives and Chemical Industries expect now to complete by 1958 the $9,000,000 superphosphate and sulphuric plant near Salisbury, Rhodesia. They will continue to produce mixed fertilizers, and to install granulation equipment. When completed the plant will extend their production to 150,000 tons.

TURKEY

Nitrogen Industries, Ltd. are building a 35,000 annual ton plant at Kutahya in Western Turkey, to produce 60,000 annual tons of ammonium sulphate.

CHANGES

Allied Chemical has consolidated the San Francisco sales offices of its operating divisions in new quarters in the Russ Building, 235 Montgomery St., San Francisco 4. Phone Yukon 2-6840.

* * *

Chipman Chemicals, Ltd. having merged with **Canadian Industries Ltd.** has opened main offices in Hamilton, Ontario, considered the pesticide consuming center of Canada. District offices have also been established at Winnipeg and in Hamilton.

* * *

Peter Colefax, president of **American Potash and Chemical Corporation,** and **Wilson Meyer,** president of **Wilson & George Meyer & Co.,** announce that by mutual agreement, the long-standing arrangement under which the Meyer firm has represented American Potash & Chemical Corporation in the sale of "Trona" agricultural potash, borax, soda ash and salt cake in various western sales areas will not be renewed upon its expiration in mid-1956.

The expansion of American Potash & Chemical Corporation in its field of manufacturing and the added responsibilities of the Meyer Company in its field of distribution have resulted, in recent years, in the development of divergent interests. Both parties therefore

NEW TREND IN AMMONIA PLANTS

LUMMUS' 60 T/D UNIT FOR WESTVACO

One of the least expensive ammonia plants ever built went on stream in October 1955 at the South Charleston, West Virginia plant of the Westvaco Chlor-Alkali Division, Food Machinery and Chemical Corporation.

It is a small, automatic unit designed to operate with a labor force of two operators per shift, and produce 60 tons per day of anhydrous ammonia from waste chlorine cell hydrogen. Carefully designed and engineered for low investment and low operating costs, and incorporating all the latest safety features, the plant will have an unusually short payout time.

This small, minimum investment unit may well be the prototype for agricultural and industrial ammonia plants of the future. Because ammonia cannot be shipped over long distances, many such units, properly placed at hydrogen, natural gas, fuel oil and other sources throughout the country, would conveniently serve limited local areas.

Lummus built the plant around existing Westvaco facilities in an extremely confined area (as shown in the above photograph) without interrupting any normal plant operations, yet completed the job ahead of schedule in a brief seven months, with an excellent start-up. Westvaco was pleased with the job all along the line, from idea through operation.

This is one of four ammonia projects by Lummus in the last two years, and adds another to the 700-plus major installations completed by Lummus throughout the world.

May we work with you on your next project?

The Lummus Company, 385 Madison Avenue, New York 17, New York. *Engineering and Sales Offices:* New York, Houston, Montreal, London, Paris, The Hague, Bombay. *Sales Offices:* Chicago, Caracas. *Heat Exchanger Plant:* Honesdale, Pa. *Fabricated Piping Plant:* East Chicago, Ind.

LUMMUS

DESIGNING ENGINEERS AND CONSTRUCTORS FOR THE PETROLEUM AND CHEMICAL INDUSTRIES

arrived at the mutually agreeable decision to sever their old relationship.

In commenting on the decision, Colefax stated the change was being made with full appreciation of the many valued services performed by the Meyer organization for the past 20 years. Meyer, in turn, complimented Colefax on his leadership and extended him best wishes for the success and continued growth and expansion of American Potash & Chemical Corporation.

* * *

Shell's agricultural chemical sales division moved the office of its recently consolidated Delta-Houston district from Jackson, Mississippi, to New Orleans on February 8. The central location of New Orleans was given as the reason for the move by **F. W. Hatch,** the division's manager.

Coincident with the move the district will be named New Orleans with **J. F. White** continuing as district manager. The office will be located at 119 South Claiborne, New Orleans 12, Louisiana, phone EXpress 1561.

The company will maintain its area office in Houston under the supervision of **A. J. Geron.**

The consolidated district now covers a seven-state area: Texas, Oklahoma, Arkansas, Mississippi, Alabama, Louisiana and part of Tennessee.

* * *

The Eastern and Western fertilizer divisions of **Olin Mathieson Chemical Corp.** have been consolidated under the direction of **Samuel L. Nevins,** vice president of the corporation, with headquarters in Little Rock, Ark.

The announcement was made in New York by **T. S. Nicholas,** president.

Mr. Nevins said that the corporation had grown so fast in the last few years it was becoming too difficult to handle all the administrative work from New York and Baltimore, the latter the headquarters of the Eastern division.

The company may eventually find it necessary to erect its own office building, he declared.

Mr. Nevins was recently honored by the University of Arkansas, for his outstanding contributions to the state of Arkansas.

Mr. Nevins has been called the "father" of high analysis pelletized fertilizer, has made many advances in fertilizer technology, and was responsible for the first commercial plant at McKamie, Columbia county, the recover elemental sulphur from sour gas.

The headquarters of the insecticide division will be in Baltimore, and Edward Block, a director of the corporation, and former president of Blockson Chemical Co., Joliet, Ill., prior to its recent purchase by Olin Mathieson, will be responsible for operation of the phosphate chemical and plant food divisions, including the Blockson plant, and the Baltimore plant, with headquarters in Joliet.

D. W. Drummond, vice president, will be responsible for operation of the industrial chemical and hydrocarbons division, including the Morgantown plant.

* * *

Merger of **Wilson Chemical Sales Company, Portland, Ore.,** with the newly formed **Great Western Chemical Company,** sales agents and distributors of agricultural and industrial chemicals, is announced by **W. C. McCall** and **Richard H. Wilson.**

Mr. Wilson, who has more than 20 years experience in chemical sales to agriculture and industry, will be general manager of the new Portland operation. Previous to forming his own company two years ago, he was associated with another distributor and most recently with **Chipman Chemical Company.**

Temporary headquarters of Great Western Chemical Company are at 1504 NW Johnson Street. The company expects to relocate office and warehouse facilities in the near future, according to Mr. Wilson. He is in the process of selecting department heads and forming a sales staff.

Great Western also recently announced merger with the chemical and raw material division of **Carl F. Miller & Co.,** in Seattle.

* * *

California Spray-Chemical Corp., announced opening of a new branch office in Sodus, New York. It will service Wayne and surrounding counties. **William A. Rolston** will be branch manager.

* * *

Merts Equipment Company, P. O. Box 331, 300 S. Slappey Dr., Albany, Georgia, has been appointed to sell and service the Michigan line of tractor shovels and excavator cranes, products of the construction machinery division of **Clark Equipment Company,** according to an announcement by **Clarence E. Killebrew,** Clark vice president. The dealer will handle Georgia counties south of, and including, Chattahoochee, Marion, Schley, Macon, Dooly, Pulaski, Dodge, Wheeler, Montgomery, Toombs, Tattnall, Evans, Appling, Pierce, Brantley and Charlton.

Thomas W. Richardson, who has been chosen by Ashcraft-Wilkinson to head their new branch office at 201 Weil Building, Montgomery, Ala., which will serve Alabama and northwest Florida.

Mainline Equipment Company, Inc., 818 S.W. Ninth Street, Des Moines, Iowa, has been appointed to sell and service the Clark Equipment Company line of tractor shovels and excavator cranes. The dealer will handle the Michigan products in Iowa counties east of and including Dickinson, Clay, Buena Vista, Sac, Carroll, Audubon, Adair, Union Ringgold; and west of and including Worth, Cerro-Gordo, Franklin, Hardin, Marshall, Jasper, Marion, Monroe and Appanoose. **R. V. Hicklin** is president and general manager of Mainline Equipment Company.

* * *

Industrial Service Laboratory, located for many years at 525 Sixth Avenue, Des Moines, has moved to a new building at 817 Seventh Street, where it will have additional space and facilities. **Mrs. Esther M. Johnston,** who owns and operates the laboratory, is a consulting and analytical chemist specializing in service to commercial feed, fertilizer and agriculture chemical manufacturers.

Plant Expansion At Hough Co.

The Frank G. Hough Co. of Libertyville, Illinois, has just announced the construction of a 55,000 square foot addition to its plant to meet the increased demands for "Payloader" tractor-shovels. The new buildings, which are expected to be completed this year, will give the plant a total of 368,000 sq. ft.

Personals

Dr. Charles S. Fazel, vice-president of the **Nitrogen Division** has retired after 30 years with the company.

* * *

John W. Kennady has become salesmanager of **Diamond Black Leaf** crop chemicals.

* * *

Wood Chemical Co., Lubbock, Texas, has announced the following officers and directors:

W. R. Wood, President; **D. R. McKinney,** Vice-President — Product Development and Control; **Basil Smith,** Vice-President — Production; **Don M. Dudley,** Vice-President — Sales; **Roy J. Walker,** Secretary-Treasurer; **Virgil Smith,** Director; **Herman Chessir,** Director; **H. D. W. Naylor,** Director; **Kay E. Teaff,** Director.

W. W. "Woody" Wilson who has joined United States Potash as mid-Western sales representative, the territory from which John E. Fletcher has been moved to become assistant salesmanager in New York.

New officers have been elected to head **Fulton Bag & Cotton Mills** and eleven directors were re-elected during the annual meeting of stockholders. Chosen as chairman of the board and president was **Robert O. Arnold,** Covington, Ga., who has been a director of the company for the past year. Widely known in the business world, he has an extensive background in the textile field. During his business career he has served as vice president of the **Mallison Braided Cord Company,** Athens, Ga., and as president of **Hampton Cotton Mills,** Hampton, Ga. and of the **Covington Mills,** Covington, Ga. Currently he is a director of **Dan River Mills,** the **Georgia Railroad and Banking Co.,** and several public utilities and insurance companies within Georgia. He is also prominent in a number of civic activities.

Union Bag and Paper has made announcement concerning these three: Left, C. M. Campbell to handle multiwall bag sales in Minnesota, North and South Dakota, Center, F. M. Whittaker, who moves to the Chicago office, now covering Iowa, western Illinois and part of Chicago. Right, A. J. Sohmer, to handle multiwall sales in Delaware, Maryland, Virginia and part of West Virginia from the Baltimore office.

RED FACE DEPARTMENT

Last month an item appeared about Armour's F. L. Wooten Jr., from which the printer had dropped two lines obviously changing the whole sense. Here's the way it should have read:

* * *

F. L. Wooten Jr. has been transferred to the general office of **Armour Fertilizer** in Atlanta as unit sales manager. He was formerly manager of the firm's Wilmington, N. C. division.

Three divisional vice presidents were named including **Norman E. Elsas,** Atlanta, Ga., vice president and general manager mills division; **Clarence E. Elsas,** Atlanta, vice president and general manager fabrics division; and **Jason M. Elsas,** New Orleans, La., vice president and general manager bag division. Also elected as vice presidents were **Fred G. Barnet,** St. Louis, Mo. and **E. Monroe Hornsby,** New York, N. Y. while **E. A. Cronheim,** Atlanta, was named secretary and treasurer. Re-elected to the board of directors were Robert O. Arnold, Norman E. Elsas, Clarence E. Elsas, Jason M. Elsas, Fred G. Barnet, **William N. Banks,** Grantville, Ga.; **Norman D. Cann,** Washington, D. C.; **Herbert R. Elsas, William E. Mitchell, James D. Robinson, Jr.** and **Francis Storza,** all of Atlanta.

Under the new divisional organization, headquarters for both the mills and fabrics divisions will be in Atlanta, while bag division headquarters will be centered in New Orleans. The mills division will control manufacturing and finishing operations at Fulton's Atlanta mills, bleachery and finishing plant. Selling of these mill-produced goods, which includes a wide variety of industrial fabrics, will be the chief responsibility of the fabrics division. The bag division will concentrate its efforts in the production and sale of cotton, burlap and multiwall paper bags, other items being converted at the various plants and canvas products.

In keeping pace with Fulton's increasing volume of business, this newly created divisional arrangement will streamline production and sales activities, resulting in greater coordination within the company's widespread operations.

* * *

R. N. Conners, executive vice president of the **Chase Bag Company,** has been re-elected president of **Textile Bag Manufacturers Association,** according to an announcement from headquarters of the trade group in Evanston, Ill.

* * *

T. J. Semmes, president Semmes Bag Co., Memphis, Tenn., was re-elected vice president.

* * *

Appointment of **Paul E. Nelson** as sales manager of the **Chase Bag Company** New Orleans branch has been announced by **W. N. Brock,** vice president and general sales manager.

Mr. Nelson replaces **J. A. Sutherlin,** who has been promoted to manager of export sales with headquarters in New Orleans.

As part of Commercial Solvents' expansion in the South, Massey K. McConnen, right, has been named Southern district sales manager, with headquarters at Sterling, La. William H. Hemeter, left, has joined the Southern district sales organization.

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BAGS MAY OPEN LIKE THIS

...but until they do,

your best choice is an

A&S Zip-Top

Today, even though your product may be the best on the market—or even unique—it must be delivered to your customers in a modern, attractive and *efficient* package, or you risk losing out to your competition.

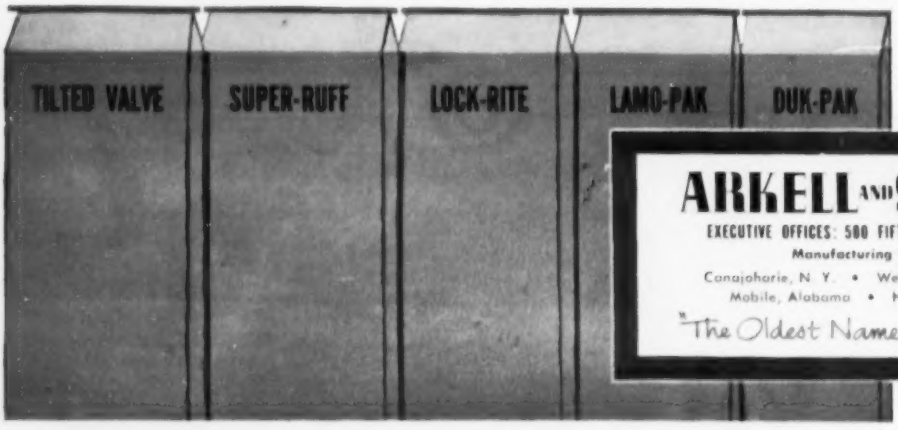
A & S "Zip-Top" Multiwall Bags combine the art of package design with the science of package engineering. Starting with the popular A & S sewn valve and sewn open-mouth bags, we have modified the manufacturing process to include a simple and economical innovation, permitting easy opening with *one sharp pull*. In a matter of seconds, your product pours out through the smooth, wide multiwall mouth... no waste and no time lost.

And to remind your customers of the name of the firm whose products come in such *convenient* bags, we design and print eyecatching display advertisements on them... using the most efficient and up-to-date presses, inks and techniques.

When you start using A & S "Zip-Top" multiwalls, you can be confident that your customers will get the best possible impression of you and your products!

Let A & S take over your packaging problem today!

FOR ADDITIONAL INFORMATION, WRITE TO ARKELL & SMITHS, PACKAGING DIVISION, CANAJOHARIE, NEW YORK.



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"The Oldest Name in Paper Bags"

Great Western Chemical Company general manager **R. W. Wilson** has named **John M. Marsh,** Forest Grove manager for **E. F. Berlingham & Sons'** grain-fertilizer department, to new post of agricultural chemical division manager.

* * *

Donald K. Wright has been named manager, By-Products sales of **American Smelting and Refining Company** by **S. D. Strauss,** vice president in charge of sales. He assumes the duties of **Leslie G. Matthews** who retired December 31.

* * *

St. Regis Paper Company announces that **Willard E. Hahn,** vice president, has been named manager of manufacturing for all St. Regis packaging and converting plants as well as for the engineering and machine department and the wire tie department of the company.

* * *

J. A. Schmidlein, a chemical engineer with **American Cyanamid** for 15 years, has been named assistant plant manager of the Niagara plant of **North American Cyanamid Ltd.,** it was announced by **D.McC. Collette,** plant manager.

Mr. Schmidlein has been director of the chemical engineering division of the company's Stamford, Conn., laboratories since 1952.

His appointment fills a newly-created position at the Niagara plant, the original manufacturing unit of the Cyanamid organization.

* * *

Two personnel changes in **Shell Chemical Corporation's** agricultural chemical sales division were announced by **F. W. Hatch,** division manager.

C. H. Daniels, recently returned from a special assignment, was appointed to the Atlanta district as a sales development field representative. He started with Shell in its Boston division in January, 1947. **O. W. Whitehead,** formerly with the USDA, who has joined Shell's Atlanta district as a sales representative, was district supervisor of plant pest control at Statesboro.

* * *

George Johnson, associate editor of **Successful Farming,** has joined the agricultural department of **E. H. Brown Advertising Agency** of Chicago, February 1.

* * *

Mason E. Lee, Jr. formerly with **Hammond Bag & Paper Company, Inc.** traveling Georgia, Alabama, Mississippi, and Louisiana with headquarters in Atlanta writes us that he has resigned to accept a position as a traveling auditor with the Department of Public Welfare, State of Georgia. Mr. Lee joined the bag industry with **Bemis Bro. Bag Co.** at Norfolk, Virginia, in 1946.

* * *

In recognition of his achievements in chemical research and as an industrialist, **Samuel L. Nevins,** vice president, **Olin Mathieson Chemical Corporation** was awarded an Honorary Doctor of Laws Degree, the highest honor a college can bestow, at the mid-term convocation of the University of Arkansas. Mr. Nevins is responsible for the Corporation's Plant Food Division, with headquarters at Little Rock.

* * *

Fred Grasser, 27, has been hired as assistant production superintendent by the fertilizer division of **J. R. Simplot Co.,** it was announced by **Grant Kilbourne,** division manager.

* * *

Atkins, Kroll & Co., San Francisco, Los Angeles and New York, announces that **Robert T. Brownscombe** is now associated with them in fertilizer sales.

* * *

Jay Morse Ely has been elected executive vice president and a director of the **Flo-Mix Fertilizer** corporation, Houma, La.

* * *

John C. Anderson, president of **The Agriform Company, Inc.,** has been elected to the board of directors of the **Carolina Fertilizer Association.**

* * *

Addition of **Dr. Harold J. Miller** to the technical development department, **Pennsylvania Salt Manufacturing Company** of Washington was announced by **Errol H. Karr,** vice president. He joined Pennsalt in 1948.

* * *

R. E. Jury, vice president of western sales for **Arkell and Smiths,** announces the appointment of **Charles R. Bronaugh** as sales representative in Kansas and Nebraska.

* * *

C. D. Haxby has been elected president of the **National Constructors Association** for 1956. Mr. Haxby, who is also vice president of **The Rust Engineering Company,** succeeds **T. C. Williams,** also president of **Stone & Webster Engineering Corporation.**

Among the new members of the executive committee are **Paul S. Klick, Jr., Foster-Wheeler Corporation;** and **G. I. Seybold, Chemical Construction Corporation.**

* * *

T. H. Ashton, director of central operations for **Bemis Bro. Bag Co.,** announces the retirement of **R. C. Van Horn** as manager of the company's Indianapolis plant and sales division. He has been succeeded as manager by **D. A. Clarke.**

Mr. Van Horn started with Bemis at Indianapolis in 1906; Mr. Clarke joined them in 1938.

* * *

Firman E. Bear, long with **Rutgers University,** writes us that his wife and he are leaving March 15 for a trip by air round the world, stopping in Honolulu, Japan, Philippines, Hong Kong, Bangkok, Karachi, Calcutta, Benares, Delhi, Damacus, Beirut, Jerusalem, Greece, Rome, Madrid, Lisbon and The Azores. They want to find out "how all these people look and act, their possibilities and problems."

Zinc

(Continued from page 36)

farmers, according to our present information, would benefit appreciably by the use of zinc as a fertilizer material. However, in areas of severe zinc deficiency, a small amount of zinc may mean the difference between a harvestable crop and no crop at all. Further development of zinc deficiency on Tennessee farms might well be minimized by judicious use of lime and fertilizer, taking care to avoid an excess of any nutrient over and above what is needed for optimum yield of the crop being produced. Apparently such caution is particularly important on soils which are extremely high naturally in phosphate. Under these conditions, liming must be moderate and, preferably, use should be made of dolomitic materials. Good rotations, which help maintain organic matter levels, along with optimum levels of potassium, calcium and magnesium, may well become more and more important as we attempt to reach high yield levels of all crops.

Further studies of the problem of zinc fertilization in Tennessee are desirable, and some of these studies are already under way. These studies include an evaluation of the residual effects of a single zinc application, the rates of zinc needed for broadcast application to forage and grain crops, and the evaluation of other sources of zinc.

APPLICATING EQUIPMENT FOR COMPLETE LIQUID FERTILIZER

By R. B. Ellsworth
Consulting Chemical Engineer

Three years of experience in applying complete liquid fertilizer in the Midwest has brought forth important developments resulting in a satisfactory line for both custom and "do-it-yourself" equipment. The pioneers of the industry were faced not only with developing complete liquid fertilizer formulas on a competitive cost basis, but they were without the necessary equipment to apply the material. The first piece of equipment to be used satisfactorily in the Midwest was an applicating truck carrying a 1,000 gallon tank for non-pressure nitrogen solutions. On the back of the truck was a 33-foot wide boom with spray nozzles and a pump powered by gasoline engine. The first five tons of 8-8-8 was applied satisfactorily with this arrangement, and this is still the basic design of the custom applicator truck. This equipment is obviously for broadcasting fertilizer for pre-cultivating. It is also used extensively for top dressing and for spraying crop residues for winter plow-down. Liquid fertilizer sticks fast to the crop residues and the rotting procedure is much faster than without the fertilizer.

A modified unit with a 500 gallon tank to hold 2½ tons of liquid fertilizer has been made available for ¾ ton pick-up trucks. This unit is of particular interest to custom applicators and the larger farm operator for their own use. This unit is also for broadcast operations. Pastures can be fertilized with these units using drop pipes on the booms.

The speed of this equipment is of particular interest. The application is done at the rate of from five to ten miles per hour across the field and with the 33-foot boom covering about 40 acres per hour. We have records of custom applicators fertilizing 300 acres per day, although the average is nearer 150 acres per day. Nurse tank trucks are usually employed in this operation. Application rates may be varied from 150 lbs. to 1500 lbs. per acre depending upon the speed of the truck, size of nozzles, and pump speed.

Draw bar applicators for tractors have been available in mild steel and stainless for the last two years. These are usually two-wheeled units with three sub-surface knives and with an 18-foot spray boom as optional equipment. A 200-gallon tank is carried on the two wheels and a compressor or a small pump is driven from the tractor power take-off. There should be a warning at

Upper left: Tractor-mounted units for use with planters and cultivators.
Left center: 4,000 gallon farm storage tank. Other tanks vary from 500 to 2,000 gallons.
Lower left: Pump and motor mounted on side of 5-ton applicator truck.
Top right: Five-ton applicator truck for custom application.
Upper center right: Skid type applicator units with pump and engine for flat bed trucks.
Lower center right: Draw bar applicator with combination knives and spray boom, complete with power take-off pump for compressor. This is built of steel and stainless steel.
Bottom right: Typical corn planter equipped for liquid fertilizer and gravity feed. Flow automatically cut off when shoes are raised.

TRIPLE SUPER-PHOSPHATE

1. RUN-OF-PILE FOR MAXIMUM AMMONIATION
2. GRANULAR FOR DIRECT APPLICATION
3. PROMPT SERVICE TO MEET EVERY REQUIREMENT

These three-fold advantages to Triple Superphosphate from U. S. Phosphoric Products are enhanced by quality and dependability of highest order. For nearly 30 years this company has been a steady and completely satisfying source for superior phosphate fertilizers, and can meet your every requirement. Your Bradley & Baker sales representative will be glad to arrange your shipments to serve you best.

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ST. LOUIS, MO. • NORFOLK, VA. • HOUSTON, TEX.

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BAGPAK PALLET
(Trademark)

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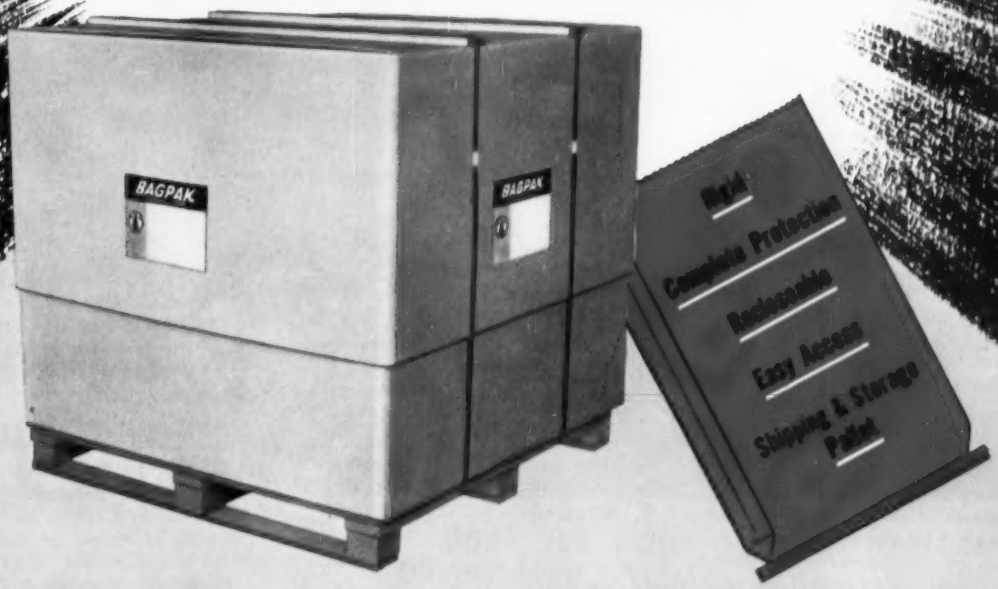

After months of development and severe shipping tests International Paper Company offers a new service—the sensational, new BAGPAK (Trademark) PALLET, which gives you these advantages:—

- **NO chafed or damaged bags**
- **Bags arrive Factory-Fresh—NO distortion**
- **Neater storage—safer, higher stacking**
- **Complete protection for your bags from dust or contamination**
- **Savings in handling and storage**
- **Replaceable cover feature—protects unused bags**

The new BAGPAK (Trademark) PALLET at no extra charge*

(Note* Shipping wts. 1500-1800 lbs.)

Let BAGPAK (Trademark) ship you a car of multiwalls in these new money saving BAGPAK (Trademark) PALLETS.

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this point, that the usual aluminum-constructed draw bar applicators designed for nitrogen solution are subject to considerable corrosion when used with complete liquid fertilizer. The draw bar applicator is for both surface and sub-surface application, and is used extensively for side dressing as well as surface applications. The draw bar equipment is essentially for the "do-it-yourself" farmer.

The farmer also has available the corn planter attachments now for complete liquid fertilizer from implement manufacturers. Many farmers have equipped their tractors with 55 and 100 gallon drums mounted directly on the tractors. The fertilizer is fed through a distribution system of hoses to cultivators, disks, corn planters and other similar equipment. This is for gravity feed or a power take-off pump. Farm storage tanks are necessary for the farmer operation and these tanks are frequently supplied by the fertilizer manufacturer in sizes from 250 to 4000 gallon capacities.

Many of the complete liquid fertilizer manufacturers have transport trucks for direct delivery to the customer. These tanks carry 15 to 17 tons. Some transporting has been done by railroad tank cars, but the freight is very high because the product has not yet been given a commodity classification.

The recommended materials of construction for the foregoing equipment will include: stainless steel, mild steel, ni-resist steel, rubber and plastic. On the other hand, aluminum, bronze and brass are subject to considerable corrosion by complete liquid fertilizers, and no practical inhibitors have been found yet to our knowledge. Even mild steel has its limitations, particularly if the fertilizer has not been correctly formulated. Liquid fertilizer formulated by the HYDRO-CYCLE SYSTEM can be stored satisfactorily in mild steel tanks for many years. Applicating equipment supplied for the HYDRO-CYCLE SYSTEM use mild steel tanks, modified stainless steel pumps and stainless steel spray nozzles. Valves, strainers, gauges, meters and all other accessories are built of materials necessary to give long service, free of corrosion, at the lowest cost. Stainless steel through-out would be ideal, but naturally would be prohibitive in cost.

New equipment is being designed all the time to meet the needs of the various territories in which the manufacturing plants are being built. The foregoing is simply a progress report up to the present moment. The industry welcomes the implement manufacturers' interest in making the equipment available because there are so few manufacturers at the present time. It is the intention and duty of the liquid industry to not only provide complete liquid fertilizer to the farmers, but to make sure that he has all the necessary equipment for application to save labor and time. It is with these tools that the farmers of America can best benefit from the advantages of this new product—complete liquid fertilizer.

MEETINGS

Two Meeting Dates Changed: South Carolina Plant Food Assn. to August 30, at Clemson House, Clemson, S. C.; **Texas Fertilizer Conference** to January 3-4 at College Station, Texas.

* * *

The 1956 annual **Kentucky Fertilizer Conference** is scheduled for Wednesday, August 1 in the Guignol Theatre, University of Kentucky.

* * *

The fifth annual **Western Production Conference,** meeting in Fresno, Cal. March 6-7 in considering cotton growing problems from the standpoint of reduced cost and increased efficiency.

* * *

Missouri and Kansas farmers were given a short course in the economic value of irrigation February 22 in Richmond, Mo. with leading speakers, such as **Dr. Arnold Klemme** of the Missouri AES, **Olin-Mathieson's** irrigation research manager, **Dr. G. G. Williams.**

* * *

The annual **South Carolina** fertilizer meeting and tour will be held July 12, beginning at the **Edisto AES,** Blackville, S. C.

* * *

The **Arkansas Anhydrous Ammonia** dealers association met February 13 to discuss ways and means to promote their product "as the cheapest source of nitrogen fertilizer."

Dr. Mark Weldon was in charge of the recent program of the annual **Fertilizer Dealers Conference** held at the **University of Nebraska.** Top yield corn growers were honored.

* * *

More than 650 are reported to have attended the **Pasture School** at Middleburg, Va. February 14-15. They heard talks by **Dr. H. L. Dunton, Dr. Roy E. Blaser, Dr. W. B. Bell, Dr. A. A. Muka, Dr. H. T. Bryant** and **Dr. W. A. Hardison,** all of V.P.I.

* * *

A series of dealer and county worker meetings was held last month in **Virginia** to discuss fertilizer recommendations. The **State 4-H Short Course** will be held June 18-23; the **All-Star Conference,** June 22-24; the **Institute of Rural Affairs,** July 17-19; the annual **Extension Conference,** August 20-25.

* * *

Pacific Northwest Plant Food Association reports distinct success for the fertilizer dealer day they held in Corvallis, Oregon in mid-January; 150 attended, at least half of whom were dealers. They will hold a **Fertilizer Conference** June 28-30 and the committee in charge is already well along with planning.

* * *

Led by a representative of **International Chemical Co.,** a meeting was held last month at Clarksville, **Texas,** the theme of which was "Making Most of a Miracle" from the picture of the same name by **National Plant Food Institute.**

INDUSTRY CALENDAR

Date	Organization	Place	City
June 10-13	NPFI	Greenbrier	White Sulphur, W. Va.
June 26-30	Soy Control	Roanoke	Roanoke, Va.
June 28-30	Pacific N.W.		Yakima, Wash.
July 18-20	SW Grade	Buccaneer	Galveston, Tex.
July 4-8	Eastern Canada	Mont Tremblant Lodge	Mont Tremblant, Que.
Oct. 19	Control Officials	Shoreham	Washington, D. C.

"The hands unload them rough"

—says Fred Schroer, Jr. of Valdosta, Ga.

"I've never seen a thread give under this pounding and believe me, if they weren't tough burlap bags, we'd have a heavy loss over the years from waste."

Fred should know. He and his brother, Herbert, now run the 1200-acre farm of their father, Fred W. Schroer, retired Master Farmer and pioneer in the modern agricultural age of South Georgia. Mr. Schroer says he's been using burlap bags since 1912 and, "During the years, I've had less trouble with burlap bags than any one thing I use. First thing I did this year was put in our fertilizer order—in burlap bags, of course. You can't beat them—no matter how you try or what you use."

That's a strong statement from such an outstanding farmer, but typical of what farmers all over the country tell us. Burlap bags are *preferred* by farmers.

Just ask your own customers—

they'll tell you that burlap

Is strong — takes dragging, dropping, *man-handling* — any tough job on the farm.

Gives good ventilation — keeps farm supplies and products fresh.

Laughs at sudden showers — wetness or dampness can't weaken it.

Saves money — extra value from re-sale and re-use.

Saves storage space — stacks to any height without slipping.

Has 1000 uses — always in demand on the farm (popular with farm wives, too!)

THE BURLAP COUNCIL

of the Indian Jute Mills Association

155 East 44th Street, New York 17, N. Y.

Dr. R. W. Pearson, with the Agricultural Research Service, USDA, Auburn, Alabama, left, and Dr. L. E. Ensminger, Agricultural Experiment Station, Alabama Polytechnic Institute, Auburn, Alabama, congratulate Keith Spencer of Australia, right, on his talk. Spencer, now studying at Mississippi State College, talked on sulfur and other fertilizer elements in Australia. The talk was given at the joint Fertilizer Evaluation Conference held at Wilson Dam, Ala., January 25-27.

TVA HOLDS EVALUATION AND DISTRIBUTOR MEETINGS

A joint conference of TVA-State Experiment Station Cooperators and the Fertilizer Work Group of the Southern Regional Soil Research Committee was held at the TVA Fertilizer-Munitions Research Center at Wilson Dam, Alabama, January 25-27, 1956.

Dr. L. E. Ensminger, Auburn, Alabama, and Dr. George Stanford, TVA, Wilson Dam, acted as co-chairmen of the conference. Although similar groups have met separately in previous years, this year is the first in which the two groups have met jointly to discuss fertilizer evaluation problems. The conference was attended by 65 agronomists and chemists of 12 states of the Southern Region, the Agricultural Research Service, USDA, and TVA. State cooperators in TVA fertilizer evaluation work also attended from Colorado, Iowa, New York, and Washington.

W. L. Hill, ARS, Beltsville, Maryland, in discussing problems encountered in fertilizer evaluation, emphasized that a nutrient mixture, such as an NPK fertilizer, should be characterized as to (1) chemical and physical nature of the components, (2) associated salts, (3) intimacy of contact of carrier salts, and (4) fineness or granularity. These specifications must be defined for successful evaluation under different soil conditions.

Uses of radioisotopes in soil fertility research were reviewed by Dr. L. E. Ensminger and Dr. R. W. Pearson of the Alabama Agricultural Experiment Station. They called attention to certain limitations in their use which have emerged as a result of accumulated experiences. T. P. Hignett and A. V. Slack, TVA, Wilson Dam, reviewed curent development and possibilities in fertilizer technology. Revealed was that as much as three-quarters of all granulated fertilizers produced in the United States are made under what has come to be known as the TVA process for granulation. Formulation of high analysis mixtures, properties of slowly soluble fused potassium-calcium phosphates, liquid fertilizers, and other topics were discussed by these two men. Other important topics relating to fertilizer evaluation, including phosphorus fixation in soils, were discussed.

Chief topics for discussion by the Fertilizer Evaluation Work Group were reports of research in connection with regional projects on the need for sulfur in southern soils and evaluation of rock phosphate for field crops in the South. These are being conducted by the ARS and various states. State Experiment Station-TVA cooperators reported on research with TVA fertilizers, including concentrated superphosphate, diammonium phosphate, calcium metaphosphate, high-alumina nitric phosphates from Florida leached-zone phosphate ores, and other nitric phosphates. These fertilizers are all produced at Wilson Dam, and some are yet in experimental stages.

Success of the joint conference was emphasized by the decision of the two fertilizer evaluation groups to meet again jointly at Wilson Dam in 1957.

DISTRIBUTOR MEET

Industry distributors of TVA fertilizers and Division of Agricultural Relations personnel at TVA met January 24 to discuss their joint educational fertilizer program.

At the meeting held at Wilson Dam, Alabama, all agreed that TVA fertilizers should continue to be used for soil improving and soil conserving crops in 1956. These are the fertilizers that the distributors sell to farmers in an educational program for specified uses. Plans were discussed for improving both the program and the products

Seated left to right around the conference table are most of the distributors present: They are Dr. Arthur Smith, Olin-Mathieson Chemical Company, Baltimore, Md. (first full view upper left); W. A. Stolt, Summers Fertilizer Company, Grand Forks, N. D.; Henry M. Carr, TVA chemical engineer, Wilson Danm, Ala.; Bill Nichols, Sylacauga Fertilizer Co., Sylacauga, Ala., and chairman of the meeting; C. B. Holly, Capital Fertilizer Co., Tuscaloosa, Ala.; Guy T. Dozier, Stevens Industries, Inc., Dawson, Ga.; J. N. Davis, Epting Distributing Co., Leesville, S. C.; Sam Marshall, International Minerals and Chemical Co., Montgomery, Ala.; and Hampton Hyder of the same company. Standing and discussing a point is Dr. L. G. Allbaugh, director of the Division of Agricultural Relations, TVA. Charles Ellis, Jr., Mutual Fertilizer Co., Savannah, Ga., is partly shown at Dr. Smith's right.

Insert: Bill Nichols, Sylacauga Fertilizer Co., Sylacauga, Ala., and Dr. Sheldon L. Clement, chief of the Fertilizer Distribution Branch, TVA, discuss the agenda.

How a Fulton-created re-usable bag cut customer's costs over 60%

By: LOUIS J EVEN, *Sales Manager*
New Orleans Branch
Bag Division
Fulton Bag & Cotton Mills

• Typical of problems solved by Fulton for chemical and other industries was that posed by the following requirements:

A supplier of plaster aggregate wanted a bag that would carry 100 lbs. of plaster *without sifting* . . . a bag that could be opened and emptied quickly at the job site, *and yet* be durable enough to re-use for deliveries to this job many times.

• This customer was delighted when Fulton came up with a heavy-duty Osnaburg fabric bag that could be opened and closed quickly.

These Fulton-created bags were used and re-used—over 30 times!

This cut the cost of delivering the aggregate by over 60% compared with ordinary, non-re-usable bags.

WRITE TODAY

Special Services Division
General Office
Fulton Bag & Cotton Mills
1408 Annunciation St., New Orleans, La.

We have a problem in packing _____

_____

(Please feel free to write Fulton full details in complete confidence)

Name _____

Company _____

Address _____

City _____

Investigate whether Fulton can solve a problem for you.

Fulton
BAG & COTTON MILLS

ATLANTA • CHICAGO • DALLAS • DENVER • KANSAS CITY
LOS ANGELES • MINNEAPOLIS • NEW ORLEANS • NEW YORK
OKLAHOMA CITY • PHOENIX • ST. LOUIS • SAN FRANCISCO
SAVANNAH • WINTER HAVEN

handled. Bill Nichols, Sylacauga Fertilizer Company, Sylacauga, Alabama, was chairman of the meeting. Ray Sorenson of Cornland Plant Foods, Grinnell, Iowa, was elected chairman for the next meeting, tentatively set for January 1957.

Ed Newman, one of TVA's chemical engineers, said that their two main objectives were to find out how to make better and cheaper fertilizers and to maintain the national defense establishment. Fertilizers and fertilizer technology are the main products that they have to offer agriculture.

Newman revealed that TVA patents for fertilizer processing are licensed to about 80 different small to medium-sized plants with each plant using 4 or 5 different processes. The processes are licensed at no cost so that they will receive the widest possible use.

Here are a few projects under way at Wilson Dam: ammoniation and granulation studies of fertilizers; production of ammonium phosphate-nitrate—25-25-0, 17-17-17; ammonium metaphosphate—17-73-0; and studies on liquid fertilizer. Newman believes that the 17-30-0 product looks promising for use in liquid fertilizers. However, there yet remain problems of production to be ironed out in the manufacture of the extremely high analysis fertilizer, such as salting out.

Attending distributors that handle the TVA products represented the following companies: Capital Fertilizer Company; Cornland Plant Foods; Darling and Company; Epting Distributing Company; International Minerals and Chemical Corporation; Mutual Fertilizer Company; Olin-Mathieson Chemical Corporation; Stevens Industries, Incorporated; Summers Fertilizer Company; and Sylacauga Fertilizer Company.

CF Staff–Compiled TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by COMMERCIAL FERTILIZER Staff

	January		December		November	Oct.-Nov.-Dec. Quar.		July thru December		January thru June		Year (July-June)	
State	1956	1955	1955	1954	1955	1955	1954	1955	1954	1955	1954	1954-55	1953-54
Alabama	22,494	33,754	15,409	20,456	37,576	105,375	183,470	167,372	272,068	844,071	924,968	1,114,238	1,074,892
Arkansas		17,565[1]	7,180	10,951	5,836	26,732	16,471	60,294	59,887	270,894	313,787	330,776	366,225
Georgia	41,187	68,552	64,682	63,977	70,201	170,229	161,692	250,968	225,083	1,047,875	1,147,157	1,273,445	1,361,254
Kentucky		*		16,541[1]	8,287	.....	*		91,386[1]	433,102	489,024	524,488	577,929
Louisiana	12,716	12,299	7,415	11,599	14,062	36,496	42,679	59,345	78,067	1,047,875	250,747	310,848	325,218
Missouri	33,953	26,854	46,863	20,816	30,272	192,620	120,579	360,211	268,257	394,979	500,020	682,690	756,457
N. Carolina	86,554	109,528	53,152	64,846	35,352	163,008	193,088	225,182	264,475	1,566,158	1,558,472	1,830,633	1,815,572
Oklahoma	1,944	5,538	1,700	2,211	3,876	29,195	28,205	69,542	58,406	63,799	72,802	122,305	144,367
S. Carolina	41,629	57,129	24,259	30,613	26,346	78,592	92,182	119,947	132,604	791,206	752,639	928,715	936,558
Tennessee	3,399	5,263	6,267	7,262	40,044	77,805	114,771	136,925	167,383	282,462	405,756	523,349	523,303
Texas	27,459	30,917	23,630	27,952	30,227	112,453	149,708	193,704	212,885	371,587	374,309	584,269	560,381
California	(reports submitted quarterly)					188,204	176,395	361,615	318,270	603,857	513,300	922,127	830,327
Virginia	(reports submitted quarterly)					.....	81,126[1]		159,185[1]	636,585	620,261	795,770	780,931
Indiana	(reports submitted semi-annually)							242,530	284,994	873,966	896,104	1,158,960	1,180,091
New Jersey	(reports submitted semi-annually)							.....	53,830[1]		231,686[1]	.....	289,614[1]
Washington	(reports submitted semi-annually)							.....	58,162[1]	124,186	101,779	182,348[1]	*
TOTAL	271,335	349,834	250,557	260,683	302,079	1,180,709	1,279,240	2,247,635	2,337,352	8,537,508	8,921,132	11,102,613	11,233,505

..... (not yet reported) * Not compiled [1] Omitted from column total to allow comparison with same period of current year.

MARKETS

ORGANICS: The market on organics for fertilizer use is steady with prices of Nitrogenous Tankage at about the same level as previously indicated. Spot supplies are available in limited quantity. Sewage Sludge Tankage continues in tight supply and prices nominally $2.95 per unit ammonia and 50c per unit APA, to $3.00 per unit Nitrogen and 40c per unit APA fob production points, in bulk.

CASTOR POMACE: Current domestic supplies available in limited quantity at $40.00 per ton bagged, FOB eastern production points.

DRIED BLOOD: Unground, sacked Blood at $4.75/$5.00 per unit Ammonia delivered Chicago Area, and New York slightly higher.

POTASH: No unusual activity in this market. Shipments against domestic contracts are in seasonal volume.

GROUND COTTON BUR ASH: Demand for this form of Potash, primarily in the form of Carbonate of Potash, continues good and shipments steady to contract customers. Current analyses are running about 38/42% K_2O Potash and prices delivered to most areas compare favorably with the delivered cost of domestic Sulphate of Potash.

PHOSPHATE ROCK: No unusual occurrence in this market. Demand is slightly behind usual call at this time of the year due to generally slow movement of mixed fertilizers to the farm.

SUPERPHOSPHATE: Stocks are at good level for the expected demand during this season. Prices are firm to slightly upward due to increased cost of Phosphate Rock.

NITRATE OF SODA: No change in prices of imported or domestic is noted. Stocks are being built to take care of the seasonal demand with the peak demand expected in March.

SULPHATE OF AMMONIA: Stocks are long and marketing a problem in view of the slow season so far. Prices remain steady however.

GENERAL: In most parts of the country with the possible exception of Florida, demand for mixed fertilizers is getting off to a slow start this season. Inventories of materials and mixed fertilizers at Manufacturers' plants are at high levels, necessitating a slowing in the flow of raw materials to the manufacturers at the present time.

Simplicity Expands Plant 50%

A plant expansion of 50,000 square feet—50% of their present floor space—has been announced by the Simplicity Engineering Company of Durand, Michigan. The firm's products include screens, feeders, conveyors, foundry shake-outs, and sand-conditioners. All plans for the new building have been completed, and construction will begin as soon as weather permits. It is expected that the building will be finished some time this summer.

HOW THE WAGE–HOUR LAW AFFECTS OUR INDUSTRY

By Newell Brown, Administrator
U. S. Department Of Labor
Wage and Hour and Public Contracts Divisions

On March 1, 1956, the minimum wage under the Fair Labor Standards Act was increased to $1.00 an hour. This new minimum, set by the Fair Labor Standards Amendments of 1955, takes the place of the previous 75-cent rate.

Gross average hourly earnings in the fertilizer industry are well above the new minimum—they averaged $1.53 an hour last October. And three out of five production workers in the industry were estimated, almost two years ago, to be earning $1.00 an hour or more. As the gross average earnings two years ago were 11 cents an hour less than they were last October, it can be assumed that somewhat more than 60 percent of the industry's production workers are now earning at least $1.00 an hour.

Nevertheless, these earnings figures make it clear that many fertilizer firms should review their pay practices in the light of the new minimum. At the same time, it might be well to survey the other provisions of the Act—which is commonly known as the Federal Wage-Hour Law. For the U. S. Labor Department's Wage and Hour and Public Contracts Divisions, the agency which administers the law, find that most violations are unintentional and due to failure to understand fully the statutory requirements.

Before considering some compliance problems common to his industry, the fertilizer manufacturer should be certain he knows the law's basic provisions. These require:

A Minimum Wage of $1.00 an hour, beginning March 1, 1956:
Overtime Pay of at least time and one-half the employee's regular rate for all hours worked over 40 a week:

A Minimum Age of 16 years for most jobs, and 14 for a few jobs. In addition, there is an 18-year age minimum for work in occupations designated hazardous by the Secretary of Labor.

Except for the new minimum wage, the application of the law to employees of fertilizer manufacturers remains the same as before enactment of the 1955 amendments.

Investigations Show Fertilizer Industry Needs To Know More About Federal Wage-Hour Law

That some firms in the fertilizer industry need fuller understanding of this Federal Wage-Hour Law was revealed during the course of investigations made in the 1955 fiscal year by U. S. Labor Department's Wage and Hour and Public Contracts Divisions, the agency which administers the Act.

Misapplication of the minimum wage and overtime pay provisions caused investigated firms to owe $59,456 in back wages. With the minimum wage going up to $1.00 an hour, violations next year can be even more costly.

During fiscal 1955, Wage-Hour representatives investigated 58 establishments in the industry. They found 39–67 percent–in violation of the minimum wage, overtime pay, or child-labor provisions, with respect to one or more employees.

Of the 2,651 covered employees in the 58 investigated establishments, 499–19 percent of those covered–were not paid all that was legally due them. By the year's end, 33 of the violating firms had agreed to make back-wage payments totaling $28,302 to 378 employees.

The most common violation was of overtime provisions, with 62 percent of the investigated establishments failing to comply, while 19 percent showed underpayment of minimum wages. A total of $34,883 of the back wages owed was due to violations of the overtime provisions; $24,573 was due to minimum wage violations.

It was also found that 7 percent of the investigated establishments were employing young people illegally. Child-labor violations, like pay violations, can result in penalties.

While the Division's investigation findings show there are many establishments in the fertilizer industry that could improve their compliance record, it does not mean the findings are representative of complaints in the industry as a whole. The rate of violations tends to be overstated, because the Divisions concentrate investigator time where there is reason to believe violations will probably be found.

In the great majority of cases in fiscal 1955, investigations disclosed that violations were unintentional, occurring because employers were uncertain about how to apply the law. To help clear up compliance problems and prevent costly violations, your editors invited this article from the Wages and Hours and Public Contracts Divisions.

Who Is Covered?

The Federal Wage-Hour Law continues to apply to employees who are engaged in interstate commerce or in the production of goods for interstate commerce, except those who are specifically exempt.

Thus, the fertilizer manufacturer has covered employees if he sells fertilizer across State lines, or if he sells fertilizer to a customer who will ship it across State lines. A manufacturer will have covered employees, also, if he makes ingredients which he sells to another manufacturer, even though located in the same State, who uses these ingredients in producing his own products which are shipped in interstate commerce.

The law's provisions apply not only to workers who make the fertilizer, but to employees in occupations closely related and directly essential to the production of the fertilizer for such interstate commerce. Nor may the employer overlook office employees, shipping workers, janitors, porters and other maintenance employees, and sales help, since they, too, are covered by the law.

Even though the employer does not ship fertilizer in interstate commerce, either directly or indirectly, he may have some covered employees. The law will apply to employees who purchase or order materials or ingredients from other States, or who unload, unpack, check or otherwise handle goods on receipt directly from outside the State, or maintain records on such interstate activities. Also covered are employees who regularly travel across State lines in the performance of their duties, or who in the course of their jobs, regularly make use of the instrumentalities of commerce such as the telephone, telegraph and mails for interstate communication.

"White-Collar" Exemptions

Manufacturers in the fertilizer industry will want to note that the law provides a minimum wage and overtime pay exemption for employees engaged in a bona fide EXECUTIVE, ADMINISTRATIVE, PROFESSIONAL or LOCAL RETAILING capacity, or as an OUTSIDE SALESMAN as defined in regulations, Part 541, issued by the Administrator of the U. S. Department of Labor's Wage and Hour and Public Contracts Divisions.

Employers should avoid the all-too-common fault of assuming employees are exempt because they have impressive job titles or are paid a good salary. For exemption to apply, the individual's duties must meet a series of tests listed in the regulations.

Among the basic requirements for exemption are the following: (1) An EXECUTIVE employee's **primary** duty must be the management of the enterprise, or of a recognized department or subdivision: (2) an ADMINISTRATIVE employee must primarily perform office or nonmanual field work of substantial importance to the management or operation of the business: (3) a PROFESSIONAL employee must **primarily** perform work requiring advanced knowledge in a field of science or learning, or perform creative work in an artistic field.

As for sales personnel, a LOCAL RETAILING employee must regularly make retail sales of goods or services, of which more than half the dollar volume is within the State, or perform work immediately incidental to such sales. An OUTSIDE SALESMAN must be engaged to sell, away from his employer's place of business.

It is not necessary, however, that an employee spend every hour of his workweek in the specified duties. A **20-percent** tolerance is allowed. For the EXECUTIVE, ADMINISTRATIVE or PROFESSIONAL employee, the tolerance is measured by the time which **he himself** spends in a workweek in nonexempt activities. The time devoted to nonexempt work by LOCAL RETAILING employees and OUTSIDE SALESMEN may not exceed 20 percent of the hours worked in the workweek by **nonexempt** employees of the employer.

There are also salary tests for exemption of executive, administrative and professional employees, but not for local retailing employees and outside salesmen. At the present time, in light of recent economic trends, changes in these salary requirements are being considered. Should they be revised, the Divisions will make a public announcement and the new tests will be published in the Federal Register. In the meantime, for exemption purposes, salary tests remain as they were.

For the EXECUTIVE exemption, the employee must be paid on a salary basis of at least $55 a week (or $238.33 a month). For both ADMINISTRATIVE and PROFESSIONAL employees, the test is $75 a week (or $325 a month) on a salary or fee basis. Also, for employees who are paid on a salary basis of at least $100 a week, there are shorter duties tests for exemption in each of the three categories of employment. These tests also are contained in the Administrator's regulations, Part 541.

Some Overtime Pay Problems

The Federal Wage-Hour law does not require that an employee be paid each week. The employer may make his wage and salary payments at other regular intervals, such as every two weeks, every half-month, or once a month. What the Act does require is that both minimum wage and overtime pay must be computed on the basis of hours worked in **each** workweek, standing alone. Thus the employer cannot eliminate the obligation to pay overtime by averaging the hours over two or more workweeks.

Before overtime pay can be computed it is necessary to determine the employee's regular rate, since the Act requires payment for overtime hours at not less than one and

one-half times the regular rate of pay. The "regular rate" is defined in the Act to include all remuneration for employment, except certain payments such as premium payments for overtime work and work on Saturdays, Sundays and holidays, discretionary bonuses, gifts and payments in the nature of gifts on special occasions, contributions to welfare plans, and payments made pursuant to certain profit-sharing, welfare or thrift and savings plans.

Of course, the regular rate may be more than the statutory minimum but it cannot be less. Should an employee's regular rate fall below the statutory minimum, the employer must make up the difference and compute overtime on the basis of at least $1.00 an hour.

Assuming an employee receives no other compensation than that stated, here is how to figure the regular rate and overtime compensation in some typical situations:

Employee paid an hourly rate—The regular rate of pay is the hourly rate. When the employee's workweek is more than 40 hours, he is due one and one-half times his regular rate for each hour over 40.

Piece-rate workers—The regular rate is obtained by dividing the total weekly earnings by the total number of hours worked in the same week. The employee is entitled to payment of one-half this regular rate for each hour over the 40th in addition to the full piecework earnings.

Example: Harry is paid a piece rate. In one week, he worked 44 hours and his earnings came to $66. His regular rate for that week was $1.50. In addition to his regular rate, he got 75 cents (one-half of $1.50) for each hour over 40, or four times 75 cents for the overtime hours. This $3.00 overtime premium brought his total earnings for the week to $69.

Another way to compensate piece workers for overtime is to pay one and one-half times the piece rate for each piece produced during overtime hours. The piece rate must be the one actually paid during non-overtime hours and it must be enough to yield the minimum wage per hour. However, this method of payment may be used only if the employee and the employer agree to it in advance.

Example: Jim is paid 10 cents for each piece. In a week during which he worked 46 hours, he earned $50 for the first 40 hours at this rate. For his overtime hours, he was due piece and one-half or 15 cents for each piece produced. As he produced 60 pieces during the overtime, he was paid $9.00 (60 times 15 cents) as overtime pay. Thus, he earned a total of $59 for the week.

Salaried employees—The regular rate for an employee who is paid a salary for a specified number of hours a week is obtained by dividing the weekly salary by the hours.

Example: Mary is paid a salary of $60 for a 40-hour workweek. Her regular rate of pay is $1.50 ($60 divided by 40 hours). In weeks she works overtime, she is owed $2.25 (one and one-half times $1.50) for each hour over the 40th.

If a salary is paid as straight-time pay for whatever number of hours worked in a workweek, the regular rate is obtained by dividing the salary by the hours worked each week.

Example: Joe, whose hours vary from week to week, has an understanding with his employer that he will be paid $60 a week. Therefore his regular rate will vary when he works overtime. When he works 50 hours, his regular rate is $1.20 an hour ($60 divided by 50 hours). He is due one-half the regular rate, or 60 cents, for each of the 10 overtime hours plus his salary, or $66 for the week. If he works 60 hours, his regular rate would be $1.00 an hour and he would be due one-half that, or 50 cents times the 20 overtime hours plus his salary, or $70 for the week.

If a salary is paid on other than a weekly basis, the weekly pay must ordinarily be determined in order to compute the regular rate and overtime pay. For instance, if the salary is paid for a half-month, you multiply by 24 and divide the product by 52 to get the weekly equivalent. A monthly salary should be multiplied by 12 and the product divided by 52.

What Records Must Be Kept?

Under the Federal Wage-Hour Law, employers are required to keep records on wages, hours, and certain other specified items that most employers keep for their own information. No special form or order for the records is necessary.

The records that are to be maintained for exempt employees differ from those required for nonexempt employees.

Payroll records and certain other data must be kept for at least THREE YEARS from date of entry. Supplementary records, such as time sheets and time cards, need be kept only TWO YEARS. Employers may keep microfilm copies of their records, provided facilities are made available to inspect the film and the employer is prepared to make any transcription of the information contained on the film, if requested by the Divisions.

Complete information of what data should be recorded is available in the Divisions' record-keeping regulations, Part 516.

Poster Must Be Displayed

Firms that have covered employees are required to display a poster where employees can readily see it. This poster, which briefly outlines the law's provisions, may be obtained from the Divisions nearest office.

Child Labor

The law sets a minimum age of 16 for general employment and 18 for work in jobs declared hazardous by the Secretary of Labor. Children of 14 and 15 years of age may be employed in a limited number of jobs, such as office and sales work, outside of school hours. The law directly prohibits the employment of boys and girls below the minimum ages in interstate commerce, or in the production of goods for interstate commerce—including any closely related occupation or process directly essential to such production. It also prohibits the shipment or delivery for shipment in interstate commerce by any producer, manufacturer, or dealer of any goods produced in establishments in or about which minors have been illegally employed within 30 days prior to removal of the goods.

Employers should especially note that among the jobs which have been declared hazardous are the occupations of motor-vehicle driver or helper, elevator operator, and jobs involving riding on freight elevators, unless the elevator is operated by an assigned operator.

Failure to comply with the child-labor provisions can result in penalties. Employers can protect themselves against unintentional violation of the child-labor provisions of the Federal Wage-Hour Law by requiring, and keeping on file, a certificate of age for each young employee. Age or employment certificates issued under State child-labor laws are accepted as proof of age in all States except Idaho, Mississippi, South Carolina, and Texas, where Federal certificates are issued.

It Pays To Know The Law

It is a sound dollars-and-cents proposition for every fertilizer manufacturer to be sure that he is complying with the Act. Most of those employers who have had to make unexpected payments of back wages to their employees have found themselves in this situation because they were not fully informed about the statutory requirements.

The Federal Wage-Hour Law provides three methods of recovering back pay due. (1) Employees may bring suit to recover back pay and liquidated damages equal in amount to the wages withheld, plus attorney's fees and court costs. (2) On the written request of employees, the Secretary of Labor may bring suit against employers to recover back wages. However, employees who consent to suit by the Secretary on their behalf cannot recover statutory liquidated damages. (3) The Divisions' Administrator may supervise the payment of back wages for employees, under certain circumstances. The employee may not bring suit if he agreed to let the Administrator supervise the back-wage payments and has been paid in full.

Where To Obtain Information

The simplest way to avoid inadvertent violations of the Fair Labor Standards Act is to consult the U. S. Labor Department's wage and Hour and Public Contracts Divisions on any doubts. Inquiries are answered by mail, telephone, or in person-to-person interviews, at any regional or field office. These offices also supply the Divisions' publications free of charge. Regional offices are located in Boston, New York, Philadelphia, Birmingham, Cleveland, Chicago, Kansas City, Dallas, San Francisco, and Nashville. There is at least one field office in almost every State.

Marginal Farmers Out

The Census shows a drop of 600,000 in the number of the Nation's farms, a decline to 4,782,393 at the end of 1954. This is the smallest number in 65 years and the consolidation it represents brings the size of the average farm to 242.2 acres.

RESEARCH RESULTS & REPORTS

Sawdust keeps bogging up. This time it is Penn State's extension forester, Walter Simonds, who is getting publicity round and about saying "the physical structure of soil can be improved by adding a little sawdust." That word "little" helps a lot.

• • •

Nice nematode! Here's a nematode which has its virtues . . . the family Steinernemtidae is harmless to man, plants or animals, USDA has found out, and what's more they carry a disease which kills several varieties of insect pests such as the coddling moth, corn earworm, boll weevil and pink bollworm, vegetable weevil, white fringed beetle and a cabbage worm.

These friendly nemotodes pierce the intestines of the insects, release bacteria which multiply rapidly and kill the pest in 24 hours. What's more they are resistant to most insecticides and may be sprayed on crops. That can be a mighty useful nematode, and one worth getting closer acquainted with!

• • •

Irrigation alters fertilizer planning, according to A. L. Clapp, who talked recently on the subject at Kansas State where he is agronomist. He says farmers who switch from dry farming to irrigation must revise their thinking about fertilizer to produce the kind of corn yields that will make irrigation pay. He urges farmers to have their soil analyzed before deciding on fertilizer programs.

• • •

Hand vs chemical control of weeds seems to run neck and neck in the findings of Delta cotton research. When weed infestations are light and wages low, hoeing costs less because the cost of chemicals stays fixed. But hoe labor costs rise as weeds increase—which naturally swings the pendulum back. this all according to USDA bulletin 363-56, dated February 3.

• • •

Cellophane compost is the subject of an article in a recent issue of "New Jersey Agriculture." R. F. Leyden and S. J. Toth have found that chopped up waste cellophane, impregnated with fertilizer salts will yield a 3-3-3 and a 6-6-6 fertilizer. The fertilizer held by the cellophane, they found, was not lost rapidly by leaching. When the plants were well along a deliberate leaching program was instituted.

• • •

Comfort from Paris comes in the form of assurance that growing crops without soil will save the world from starvation. So even those who live in rocky highlands can enjoy home grown foods. It seems the system devised by Sholto Douglas, long a hydroponics man since his days in Bengal, has been modified to fit various climates—and now everybody can do it, everywhere. This will not be news, for example, to the California tomato folks, a large part of whose crop is now being grown by this system.

• • •

Atomic economy amounting to $210,000,000 a year is visualized by Dr. Willard F. Libbey, U.S. Atomic Energy Commissioner, who recently told the Conference on Radioactive Isotopes in Agriculture that this figure was a low estimate of the potential savings to American agriculture each year by using atomic radiation. He went on to show, in addition to what we have already learned about proper application of plant food, via isotope tests, that the new technique of preserving foods by radiation will cut tremendously from the need for rushing them to freezers; that diseases, such as Oat-Rust can be stopped by radiation caused heredity changes. But he doubts seriously that radiation will ever be used directly by a farmer to increase crop yield. Your editor still wonders about the grass the grew so lush at Hiroshima, but nobody has ever checked up on this that we know of!

• • •

Don't feed disease. Florida citrus growers have been warned at a recent conference. "A lot of money can be wasted and effort, too, putting fertilizer on diseased groves." There's a proposed force program down there which would make growers destroy diseased trees. It is being done now on a voluntary basis, but a law is in the offing . . . and it sounds like a good law for the protection of healthy groves.

ph affects uptake of phosphorus, say USDA biochemists in Bulletin 344-56, dated February 1. Tests show a crop needing 300 pounds of available phosphorus on alkaline soil may do all right with 25 pounds on acid soil. And, by the way a concern named Photovolt Corp. in New York City have a tester for checking pH meter performance, which costs only $43.

* * *

Irrigation tests, covering the same equipment, have come to us from two sources lately. The New York State AES and the Michigan AES both are making good use of the same system: gypsum blocks with two parallel electrods embedded in them, to which are attached four or five feet of waterproofed electric wire are placed at depths of 4, 12, and 20 inches. The block gains or loses water in direct relation to the moisture in adjacent soil—and as the block loses water its electrical resistance increases—and vice-versa. These changes can be measured on a meter which is calibrated to read directly the percentage of available water in the soil.

The Michigan folks point out that such tests should be made at enough locations in a given field, to make sure. And, by the way, this gypsum block method was first described in 1940 by Bouyoucos and Mick of Michigan's AES.

The radar method we described here last month sounds easier, and can check more areas with less work . . . but it probably is also more expensive than the system just described.

ADVISORY GROUP ASKS FOR EXPANDED RESEARCH

Improved methods for fertilizer quality control, new research in watershed hydrology (science of how water behaves on land), and in soil structure, and expanded studies of moisture conservation in both arid and humid regions were among top-priority research needs cited by the U. S. Department of Agriculture's Soils, Water, and Fertilizer Research Advisory Committee at its annual meeting in Riverside, Calif., January 16-19.

The committee underscored the major importance to the Nation of expanded fundamental studies on soils and water for solution of many critical problems in agriculture, and urged particularly that basic investigations of soil-water-plant relationships should be expanded.

Considering research proposals in six categories, the committee gave high priorities to a number in each grouping. Among the research needs considered most urgent were:

Fertilizer Improvement: Improve methods for fertilizer quality control. (Procedures to secure more nearly standard fertilizer-quality control.s throughout the country can best be developed by the Federal government, the committee concluded.) Study liquid mixed fertilizer formulations to determine what materials are compatible, ways of incorporating minor elements, prevention of potash salting-out, and economic methods for using wet-process phosphoric acid in liquid mixed fertilizers.

Soil and Water Management Research in Humid Regions: Expand research on methods of conserving moisture in humid-region croplands to counter recurring drouths such as those that have occurred periodically in the normally humid eastern States. Expand humid-region irrigation research to provide more information on soil-water-plant relationships. In urging more research on these problems, the committee pointed out that better and more efficient use of existing cropland in humid regions would result from an integrated research attack on the problems of water-use, control, and conservation.

Soil and Water Management Research—Irrigated and Dryland Region: Expanded research on moisture conservation and erosion control in dryland areas, including development of tillage implements and practices for wind-erosion control. Expand research on irrigation methods for more than 26 million acres of cultivated cropland, pastures, and mountain meadows under irrigation in the western United States.

Other Soil and Water Management Research: Expand studies of ways of conserving all supplies of irrigation water available throughout the Nation. Expand research on the use of nitrogen fertilizers in relation to the need for legumes and grasses in crop rotations to protect against erosion and soil deterioration.

Basic Soil-Plant Relationships: Initiate research on the fundamental aspects of soil structure that affect the production of crops. Soil structure is the arrangement of the primary particles of a soil into larger more complex particles. Both the natural structure developed by soil-forming processes and the modified structure induced by cultivation and management practices are of importance in soil productivity. Initiate a comprehensive laboratory study under controlled conditions of the complex interrelation of factors which influence the movement of water into and through soils.

Hydrology of Agricultural Watersheds: Initiate new research in agricultural watershed hydrology to meet the needs of watershed protection, flood prevention, and water supply, with particular attention to the Northeast, Southeast, and Northern Great Plains, where analyses of accumulated watershed hydrology records have indicated gaps in both geographical distribution and in the type and intensity of previous studies. Expand research on methods for predicting the sediment yield of watersheds so that high sediment-source areas can be identified and sediment loads can be predicted at reservoir sites and other installations.

The Soils, Water, and Fertilizer Research Advisory Committee, established under the Research and Marketing Act of 1946, will submit its formal recommendations on proposals discussed at this year's meeting to the Department during the next few weeks.

Members present at the meeting were: James J. Wallace, Farm Manager, Iowa State College Agricultural Foundation, Ames, Iowa, committee chairman; Wayne M. Akin, Western Farm Management Company, Phoenix, Ariz.; Everett M. Barr, Liberty, Neb.; Dr. Russell Coleman, Executive Vice President, National Plant Food Institute, Washington, D. C.; W. Lewis David, Corsicana, Texas; E. M. Dwyer, Weymouth, Mass.; Clair P. Guess, Jr., Columbia, S. C.; Lester F. King, Helix, Ore.; Dr. D. F. Peterson, Jr., Head, Department of Civil Engineering, Colorado Agricultural and Mechanical College, Fort Collins, Colo.; and Dr. N. J. Volk, Associate Director, Agricultural Experiment Station, Lafayette, Ind. Dr. C. P. Barnes of the Department's Agricultural Research Service is executive secretary of the committee.

CFA OFFERS AID TO THREE GROUPS

Bankers and others who make California farm crop production loans will soon be provided with considerable new information on the value of proper and adequate fertilization, the California Fertilizer Association announced recently.

A special committee of the Association has been named to present to these people and to their farmer clients information developed by the University of California, the fertilizer industry, and other reliable agencies. James M. Quinn, owner of the California Sun Fertilizer Company, Los Angeles, is committee chairman; and those serving with him are B. H. Jones, President, Sunland Industries, Inc., Fresno; Wilson Meyer, President, Wilson & Geo. Meyer & Co., San Francisco; Arthur W. Mohr, President, California Spray-Chemical Corporation, Richmond; George Monkhouse, Vice President, Shell Chemical Corporation, San Francisco; David Williamson, Vice President, Balfour, Guthrie & Co., Limited, Los Angeles.

Substantial financial assistance to the fertilizer research program at the Citrus Experiment Station, University of California, Riverside, and establishment of a revolving student loan fund on the Kellogg-Voorhis campus of the California State Polytechnic College, San Dimas, are assured as the result of action taken at a recent meeting of the CFA Soil Improvement Committee.

M. E. McCollam, Committee Chairman, reported that the sum of $4,000.00 was set aside as the nucleus of a fund large enough to provide for an addition of 24 lysimeters to the controlled research project which has been one of the Riverside Station activities under Dr. H. C. Chapman's direction for the past 20 years. The entire cost of the new project will be about $12,000.00, McCollam reported, and it is hoped that this Committee action will prompt other interests who will benefit to subscribe the balance of the needed funds.

Mr. McCollam said that another allocation of Committee funds was made to provide for the purchase of a new tractor, complete with fertilizer application equipment, to be donated to the University's Department of Vegetable Crops at Riverside Station, which has recently established a branch there under the direction of Dr. O. E. Lorenz. Lorenz is Vice Chairman of the Department.

A revolving loan fund was made available to the students of the San Dimas campus of California State Polytechnic College, in the amount of $500.00 on a five year loan basis. It was pointed out that there is still inadequate provision on this newest of Calpoly campuses for readily available funds for short-term loans to students in small amounts for worthy emergency needs. On the basis of experience with another similar fund now available, interest paid on numerous loans which assure rapid turn-over of the fund should double it within five years, when the Committee's loan can be repaid without interest.

AMMONIA CONTEST ENTRIES COMING IN

A Mississippi farmer, entering the Agricultural Ammonia Institute's Success Story Contest, reports dividends of $10 for each $1 spent for anhydrous ammonia fertilizer in 1955.

The farmer, J. H. Pruett of Lyon, Miss., harvested over 3½ bales of cotton per acre on a five-acre tract. His story was endorsed by R. P. Lewis, county agent.

Mr. Pruett reported he put down 100 units of nitrogen in the form of anhydrous ammonia on sandy loam land on April 10, 1955. The land had been subsoiled the previous fall. The cotton was planted during the first week of May, 1955, and received two treatments for thrip.

On June 25, it received a side-dressing of 65 units of nitrogen in the form of anhydrous ammonia. Insect control for boll weevils and boll worms were begun a month later. The cotton was irrigated twice in late summer, defoilated on October 5, and harvesting begun 15 days later.

Mr. Pruett based the value of the anhydrous ammonia fertilization on a check against a nearby field where ammonia applicator knives stopped up on a number of rows. "From the present price of cotton, after deducting the cost of fertilizer, the profits would equal about $140.00 or $10 for every fertilizer dollar spent," he said.

Cotton is one of nine classifications from which the Institute is receiving entries in its Success Story Contest. Others are corn, wheat, vegetables, pasture, rice, small grain and miscellaneous crops. Ammonia must have been used in the entrant's plant food program.

In each category of the Success Story Contest, there will be a first, second and third place winner. They will receive $100.00, $50.00 and $25.00 savings bonds respectively. The contest is open to any farmer, club boy or girl, or any user of anhydrous or acqua ammonia.

Success stories based on 1955 crops must be received by the Institute before April 1, 1956. Stories telling of 1956 crops should be mailed before January 1, 1957. All entries should be between 200 and 500 words. They should include the following pertinent information: crop, size of field, type of soil, complete fertilizer application, soil testing, irrigation, supplemental irrigation, dry land conditions, general insect program, harvest data, yield data, check plot, source of ammonia, and calculated profit from the use of the ammonia.

Each story must be endorsed by at least one of the following: County agent, Vo-ag teacher or ammonia distributor. Photographs may be included.

Success stories may be submitted to the Agricultural Ammonia Institute, 304 Claridge Hotel, Memphis 3, Tennessee.

CLASSIFIED ADVERTISING

For Sale, Exchange and Wanted Advertisements, same type now used, EIGHT CENTS a word for one insertion; TWELVE CENTS a word for two insertions; FIFTEEN CENTS a word for three insertions, and FOUR CENTS a word for each insertion more than three; ADVERTISEMENTS FOR THIS COLUMN MUST BE PAID IN ADVANCE.

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FOR SALE: Going mid-western concern engaged in strip-minning and processing of organic earth for fertilizers. Company has recently entered the growing soil packaging market. Assets include land with a large deposit of basic material, plant, processing and rail facilities. P. O. Box 43, Chicago 90, Illinois.

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POSITION DESIRED: Experience 15 years wholesale Fertilizer Materials, including nitrogen, inside sales, order, scheduling, Budgets, Transportation, Etc. Age 40 years. Willing locate anywhere opportunity may exist. Box #8, c/o Commercial Fertilizer, 75 Third St., N. W., Atlanta, Ga.

WANTED: Job as fertilizer plant superintendent. Have had seven years experience as superintendent of acidulating, mixing and shipping plant. Box #13, c/o Commercial Fertilizer, 75 Third St., N. W., Atlanta, Ga.

FOR SALE: Rotary Dryers 5′ x 30′, 5′ x 40′, 4′6″ x 50′, 5′ x 67′, 6′ x 60′, 9′ x 80′. (1) Pressure Tank 13,000 gal. 220#. Also Mixers, Storage Tanks, Screens, Elevators. Send us your inquiries. Brill Equipment Company, 2402 Third Ave., New York 51, N. Y.

FOR SALE: (4) Sprout Waldron Ribbon Mixers, 336 cu. ft. (12,000 lb.) working capacity. Rotary Dryers, 3′ x 25′; 4′ x 30′; 4′6″ x 40′; 5′ x 30′; 5′6″ x 50′; 6′ x 40′. Also Hammer mills, Pulverizers, Bucket Elevators, Screw Conveyors, Bulk-Flo Drag Conveyors, etc. Perry Equipment Corp., 1426 N. 6th St., Philadelphia 22, Pa.

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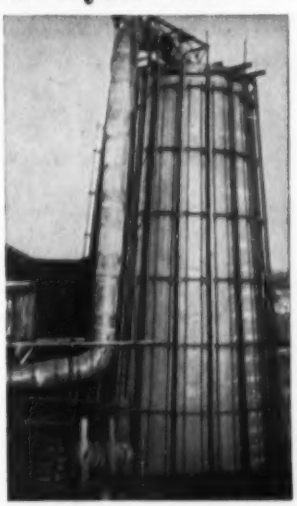

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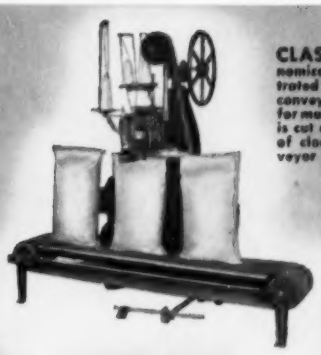

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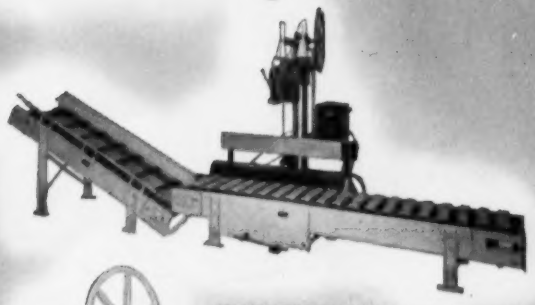

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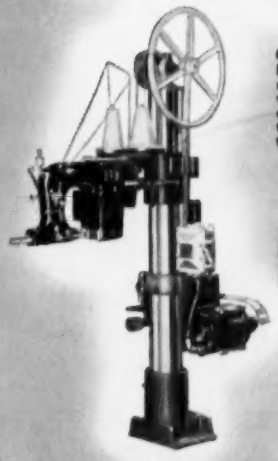

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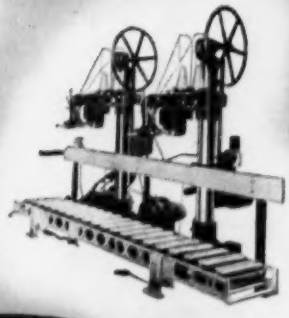

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